

592 0174

BEAUVAIS



United States
Department of
Agriculture

Forest Service

Escanaba Michigan

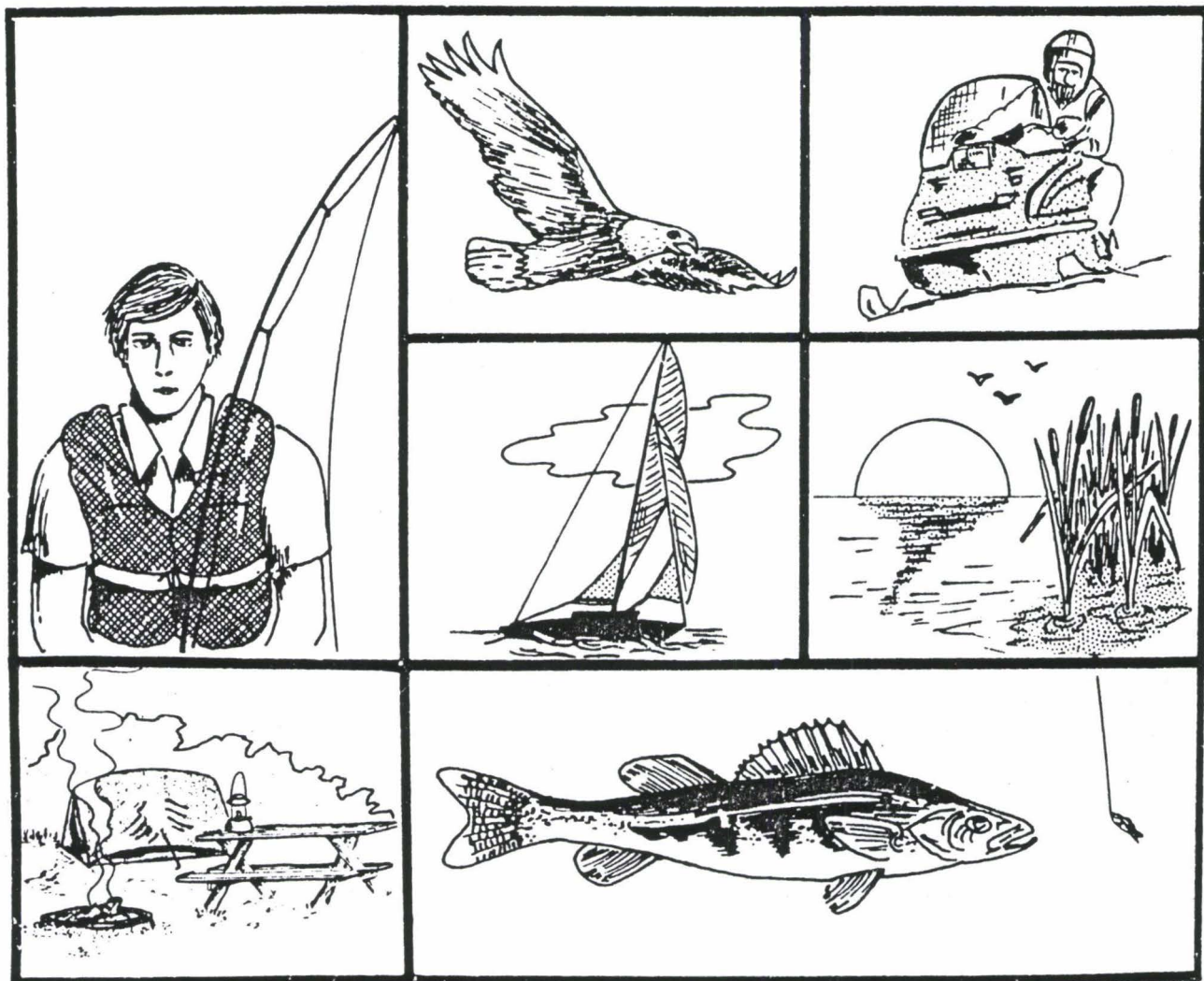
March 1985



Lake Michigan Brevoort Lake

Charting A Course For Recreation Management

Theodore W. Beauvais
Hiawatha National Forest



LAKE MICHIGAN - BREVOORT LAKE

Charting a Course for Recreation Management

Theodore W. Beauvais

Assistant District Ranger

St. Ignace Ranger District

Hiawatha National Forest

March 1985

Revised June 1985

ABSTRACT

Areas of diverse resources and recreation opportunities, with mixed ownership, and a depressed local economy can be managed to provide a compatible range of recreation experiences to the mutual benefit of the user and the economy. The Lake Michigan - Brevoort Lake Recreation Management Area offers an excellent opportunity for the Forest Service, as manager of the public lands, to cooperate towards that end. With an abundance of ideas, but limited knowledge of the area's economic and recreation resource opportunities, inventories and studies are planned as a first step towards a comprehensive master plan. There is a need to identify and quantify the recreation opportunities and experiences and the value of resources such as the Brevoort Lake fishery. A master plan will then be done to provide integrated management direction for the area.

DISCLAIMER

This paper was prepared as a student project, in partial fulfillment of the requirements of the Professional Development for Outdoor Recreation Management Short Course at Clemson University. This paper does not necessarily reflect the policies of the United States Department of Agriculture - Forest Service, or the opinions of anyone but the author.

ACKNOWLEDGEMENTS

I would like to thank Fran Gillmore for ordering publications, Rita Cain for preparing maps and lettering, Mark Gabrielson for the report cover and vicinity map, Howard Guindon for drafting, Lorna Thomas and Marilyn Booker for typing, Jackie Soderman and Ron Hannan for help in benefit/cost analysis, Sally Hess-Samuelson and Ann Long Voelkner for review and comment, JoEllen MacDonald and Diana Peterson for organizing the Bibliography, Don Meyer and Al Hershman for compiling recreation survey and use data, and my family for being understanding.

Table of Contents

TABLE OF CONTENTS

Abstract.	i
Disclaimer.	ii
Acknowledgements.	iii
Table of Contents	iv
List of Tables.	vi
List of Figures	vii
Chapter One -- Introduction and Statement of Problem.	1
A. Background.	1
B. Statement of Problem.	8
C. Assumptions and Limitations	9
D. Significance of the Study	10
Chapter Two -- Review of Literature	12
A. Literature Search	12
B. Economics and the Values of Resources	13
C. Campground Development Levels	23
D. Campers and Anglers Motivations and Attitudes	30
E. The Attitudes and Perceptions of Recreation Managers.	33
F. Recreation Planning - The Master Plan Concept	39
G. Survey Methods.	43
Chapter Three -- Procedures	50
A. The Subjects - Post-Project Camper Survey	50
B. Instrumentation and Collection of Data - Post-Project Camper Survey	51
C. Treatment of Data - Post-Project Camper Survey.	51
D. The Subjects - MDNR Creel Census.	53
E. Instruments and Collection of Data - MDNR Creel Census.	53
F. Treatment of Data - MDNR Creel Census	54
G. Subjects - Informal Recreation Surveys and Use Data	54
H. Instrumentation, Collection and Treatment of Data	54
I. Subjects, Instrumentation, Collection and Treatment of Data - Benefit/Cost Analysis	54

Chapter Four -- Analysis of Data.	56
A. Brevoort Lake and Lake Michigan Campground Visitor Survey	57
B. Brevoort Lake and Lake Michigan Campgrounds Use Data. . .	62
C. Benefit/Cost Analysis	65
D. Criteria for National Recreation Areas.	69
E. Cross-Country Ski Trail Development	70
F. Public Access to Brevoort Lake.	71
G. Concessions	72
Chapter Five -- Summary and Conclusions	73
A. Summary of Procedures and Findings	73
B. Conclusions	74
C. Discussion and Implications	76
D. Recommendations	77
Bibliography.	78
Appendix A - Response Forms, Surveys, and User Data	A-1
Appendix B - MDNR Creel Census.	B-1
Appendix C - Benefit/Cost Analysis.	C-1
Appendix D - Brevoort Reef Monitoring Plan.	D-1
Appendix E - Correspondence and News Clippings on Tourism Development, Public Access, and Ski Trail Development.	E-1
Appendix F - Master Plan Prospectus	F-1
Appendix G - St. Ignace District 5-Year Action Plan	G-1
Appendix H - Study Area Maps.	H-1

LIST OF TABLES

Table 1 - Characteristics of Brevoort Lake and Lake Michigan Campground Visitors.	58
Table 2 - Monthly Average Daily Traffic on U.S. 2 at Brevoort	60

LIST OF FIGURES

Figure 1 - Vicinity Map.	2
Figure 2 - Brevoort Lake Reef Fall 1984.	4
Figure 3 - Pointe Aux Chenes River and Marsh	4
Figure 4 - Brevoort Lake - South Shore	5
Figure 5 - Sunbathing on a Sand Dune - Brevoort Lake South Shore	5
Figure 6 - Brevoort Lake Campground.	6
Figure 7 - Boat Ramp in Brevoort Lake Campground	6
Figure 8 - Lake Michigan Campground and Dunes.	7
Figure 9 - Sand Dunes in Winter.	7
Figure 10 - Campground Collections and Occupancy	63
Figure 11 - Percent of Available Capacity Used - Brevoort Lake and Lake Michigan Campgrounds	64

Chapter 1

CHAPTER I

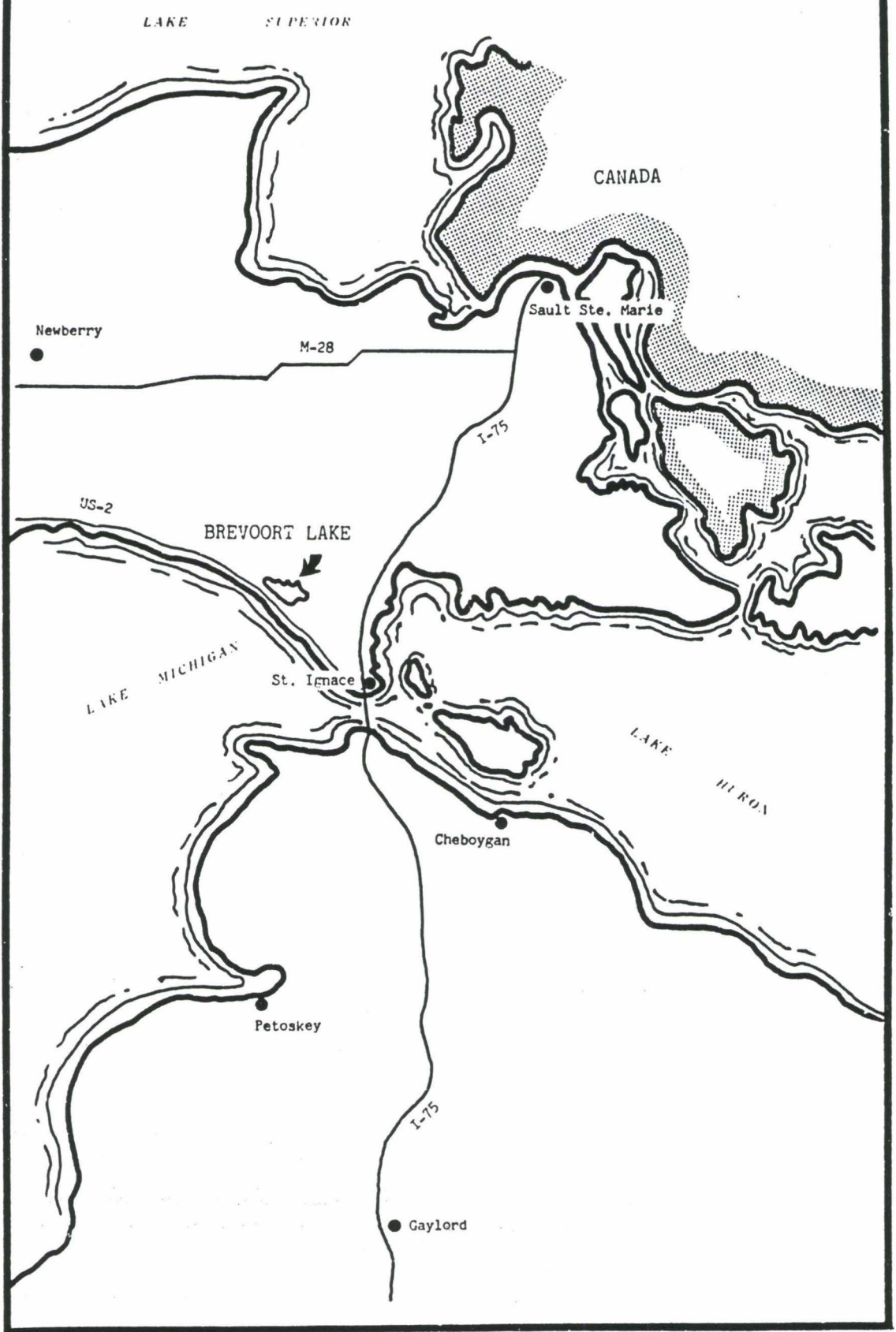
INTRODUCTION AND STATEMENT OF THE PROBLEM

The first cycle of land and resource management planning on the Hiawatha National Forest is nearing completion. In some instances the Forest Plan will provide management direction sufficient to proceed on-the-ground without further ado. In the case of the Lake Michigan - Brevoort Lake study area the Forest Plan is only outlining broad direction for recreation management. A site specific evaluation of the area's recreation potential - a master plan - is needed. To that end the author has developed a prospectus to prepare a master plan for the study area.

A. Background

Located within the Upper Peninsula of Michigan, (see Figure 1) the Hiawatha National Forest enjoys the distinction of having 77 miles of Great Lakes shoreline - more than all other national forests combined. The study area (see Appendix H, Figures 1 and 2) contains a particularly scenic 10-mile stretch of the north shore of Lake Michigan traversed by U.S. 2. The area has active and extinct sand dunes formed during the 10,000 years since the glacier retreated. Brevoort lake (4200 acres) has the largest fresh water spawning reef in the world. About two-thirds of the Brevoort Lake shoreline is administered by the Forest Service (see Appendix H, Figures 1 and 2).

FIGURE 1



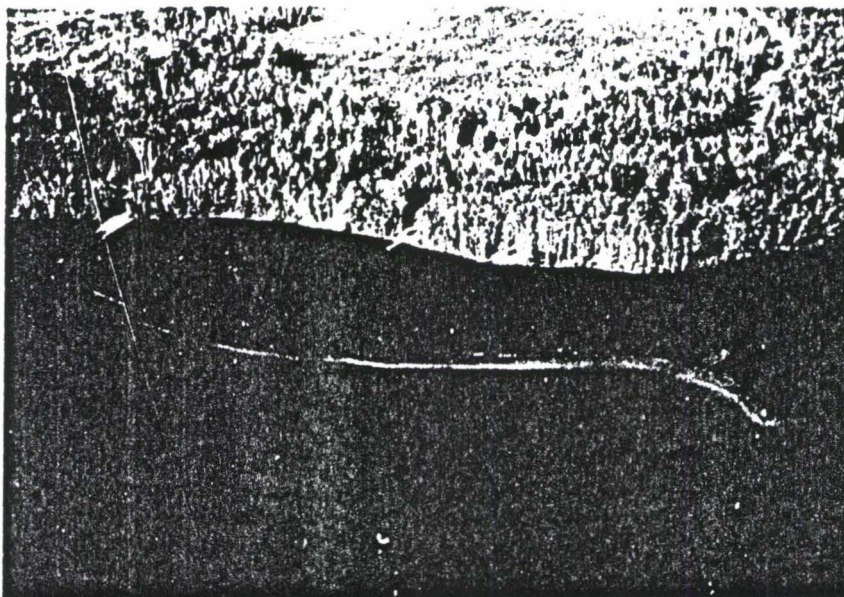
The Forest's two most heavily used campgrounds are located in the study area. Key attributes of the area are depicted in eight photographs (Figures 2-9).

The county's and state's main tourist attraction is Mackinac Island, a regionally renowned resort given over to historic preservation, exclusive hotels, horse-drawn carriages, and bicycles. Over 800,000 people visit Mackinac Island between May and October. Many of these visitors depart by ferry boat from St. Ignace, reached by crossing the Straits of Mackinac on Interstate-75's five-mile long Mackinac Bridge. Bridge crossings totalled 2.4 million in 1984. The study area is within a half-hour drive of the Mackinac Bridge.

Recreational use of the area predates the Forest Service, a relative newcomer to an area first explored by Europeans including Father Marquette in the 17th century. Acquisition of the study area began in 1935. During 1939-1940 Civilian Conservation Corps enrollees converted Lake Michigan Picnic Area to a campground. Brevoort Campground was originally developed by users sometime in the early 20th century. Both facilities were upgraded several times to development level 4 through paving roads and the addition of pressurized water systems and flush toilets. The North Country Trail, a National Scenic Trail, was constructed through the study area in the early 1980's.

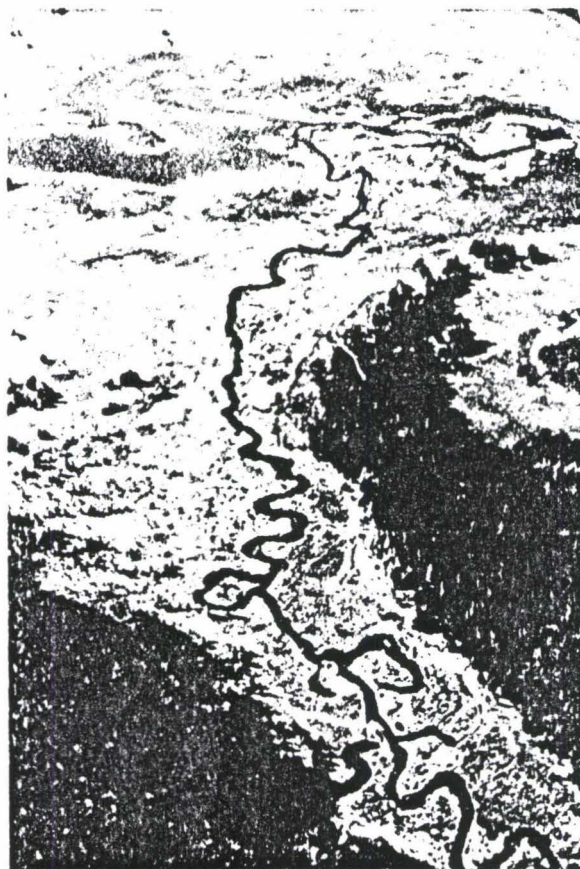
The Brevoort Lake reef (see Figure 2) has generated a lot of favorable public interest, prompting the Forest to examine its role as recreation provider and habitat manipulator in the study area. The

Figure 2



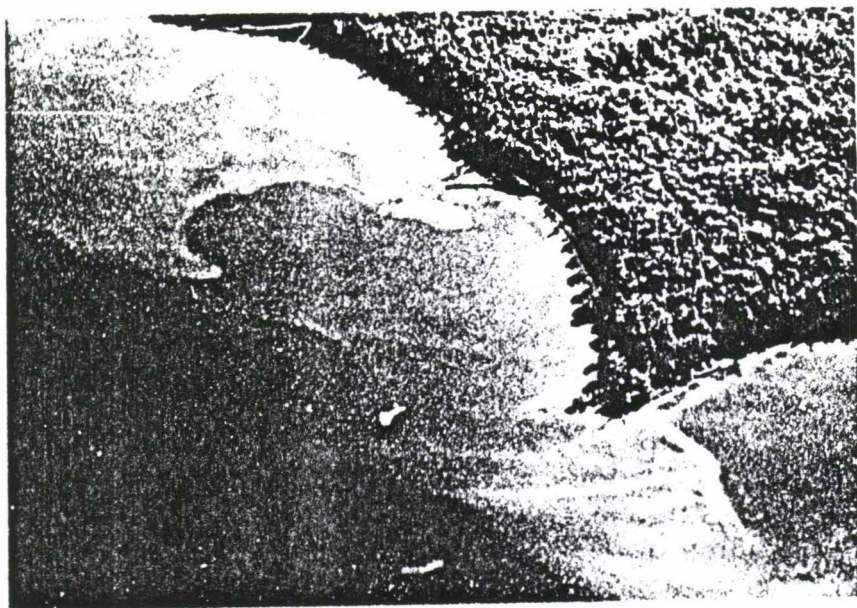
Brevoort Lake Reef Fall 1984 - 50 percent completed
 A 2100 foot rock reef designed for spawning of walleye (*stizostedion vitreum*) and other fish, food production (macroinvertebrates), and cover. Built by the Forest Service and Michigan Department of Natural Resources at a cost of \$340,000.

Figure 3



Pointe Aux Chenes (Oak Point) River and Marsh
 Bordering the sand dunes this Great Lakes Coastal wetland is excellent wildlife habitat. A Forest Service wayside and nature trail interpret the area for the public.

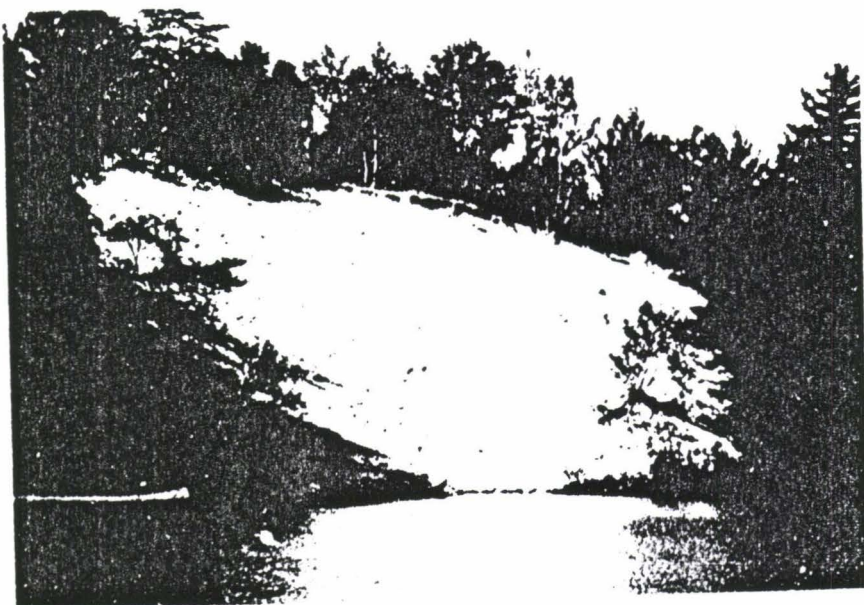
FIG. 4



Brevoort Lake - South Shore

Three miles of sand dunes front the water's edge - one third is actively eroding. Note the underwater deposits of shifting sand. Due to its instability, lack of aquatic vegetation, lack of rock, and infertility this area has been described by a fisheries biologist as, "a biological desert."

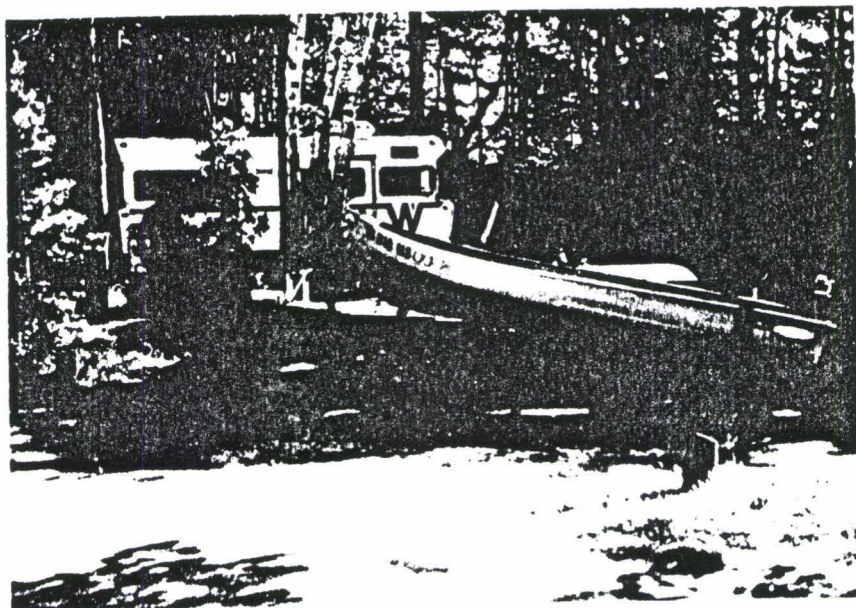
FIG. 5



Sunbathing on a sand dune - Brevoort Lake South Shore

A combination of foot traffic, waves, 19th century logging and subsequent fires have denuded the face of this extinct inland dune.

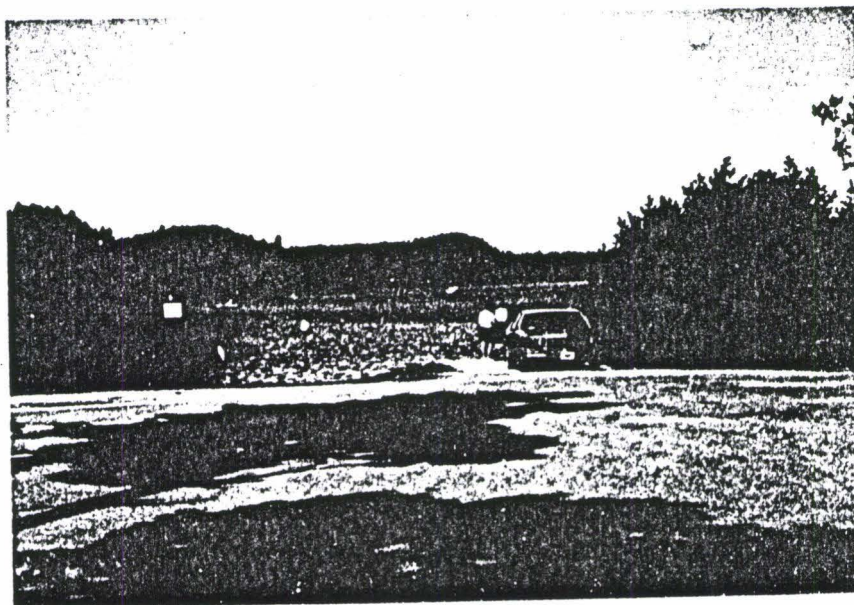
FIG. 6



Brevoort Lake Campground

Informal surveys in 1981 and 1982 showed two-thirds of the campers brought boats and stayed in a recreational vehicle, trailer, or pickup truck camper.

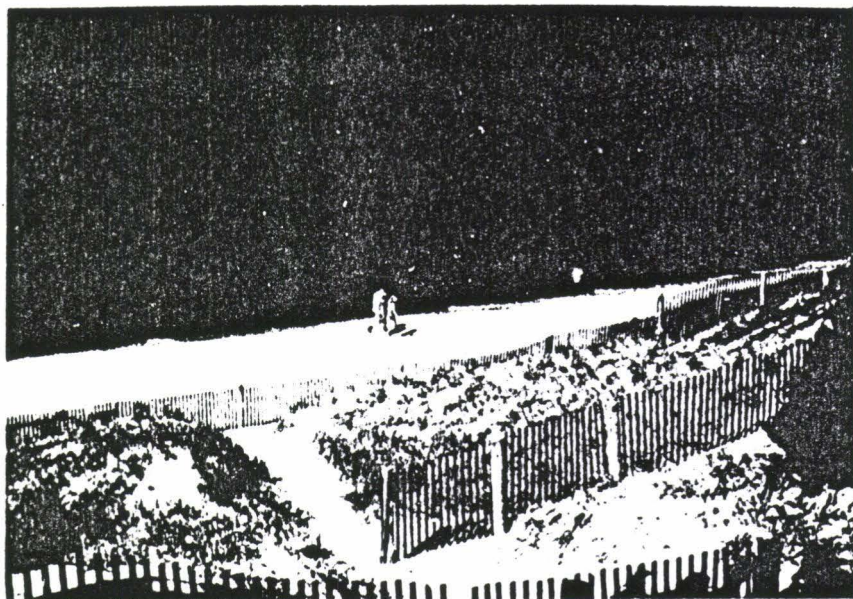
FIG. 7



Boat Ramp in Brevoort Lake Campground

This is the best launching site on the 4200 acre lake. Located right in the heart of the campground it has a parking lot for six vehicles.

FIG. 8



Lake Michigan Campground and Dunes
Snow fence was installed to control wind erosion.

FIG. 9



Sand Dunes in Winter
U.S. 2 Along the Lake Michigan Shore

2100 foot rock reef was a joint Forest Service - Michigan Department of Natural Resources (MDNR) project to maintain a self-sustaining walleye population and to add diversity to an aquatic ecosystem lacking rock substrate.

B. Statement of Problem

The problem of managing the study area was brought into clearer focus as a result of the Brevoort Reef and Forest land and resource management planning. Hiawatha National Forest Supervisor Roy E. Droege has insisted on a comprehensive evaluation of resources, roles, and priorities for the study area. He has opposed a piecemeal, project-oriented approach without first knowing how the parts fit together to form the whole. The misallocation of scarce human and economic resources is a luxury the Forest cannot afford. Preparing and implementing a master plan for the Lake Michigan - Brevoort Lake Recreation Management Area will help to answer the following questions:

- Public access to Brevoort Lake is poor. Who should provide better access and where? What will be the effects on recreational use and experiences?
- What facility development level is appropriate for Brevoort Lake and Lake Michigan Campgrounds? How should the Forest Service decide if a change should be made? Is a concession operation feasible and desirable?
- The County Economic Development Commission is promoting year-round tourism. The local cross-country ski club is looking to the National Forest to provide ski trails. What should be the Forest's role within the study area in cooperating with other agencies and organizations in trail and tourism development?
- With improved fishing, better access, and a community wastewater treatment plant coming on line by 1990 what will happen to Brevoort lakeshore property values and development? What will be the effect on the recreation resource and experiences the Forest manages?

- What remains to be done to improve the fisheries and wildlife habitat of Brevoort Lake and the streams flowing into and out of it? What are the costs and benefits? What will be the recreational and visual impacts?

C. Assumptions and Limitations

1. Due to the summer recreation season, the timing of the Clemson Outdoor Recreation Management Short Course (September 9-28, 1984), and the field project due date (April 2, 1985, deadline for review) there was no opportunity to conduct user surveys and interviews. A post-project camper survey for the Summer of 1985 is planned. The response forms to be used are Appendix A, Figures 1 and 2. The MDNR creel census will continue through the spring and summer. In cooperation with them the author has developed questions to be administered during the MDNR's interviews (Appendix B, second page of Figure 1).

2. The post-project camper survey is not intended as a statistically valid, scientific research study. Modeled after the method employed by the Allegheny National Forest, (see Appendix A, Figure 3) as presented at the Eastern Region Fall 1984 Management Team Meeting, it will provide feedback on current management and be used as part of the public involvement for the master plan and proposed projects in the area.

3. Time and resources did not allow for this field project to complete the master plan for the study area. Instead a prospectus to be used as a base for someone else (possibly a contractor) to do a master plan was set as an attainable objective.

4. Cooperation between, and funding from, several units of government and the private sector are needed to carry out some of the recommendations in Chapter 5 and Appendices F and G. Forest Service efforts are essentials but the decisions are not all the Forest Service's to make.

5. It is assumed that the Brevoort Lake Reef will result in greatly improved fishing, especially for walleye. Planned monitoring of the reef is outlined in Appendix D.

6. A master plan for the area will be "tiered to" the Final Land and Resource Management Plan for the Hiawatha National Forest (the Forest Plan) to be completed within a year.

7. The full fisheries potential of Brevoort Lake will not be attained with the completion of the Brevoort Lake Reef. The sand sediment from dune erosion on the south shore of the lake is maintaining a condition of very poor habitat. The Forest Plan and the master plan for the study area will provide fisheries habitat management direction.

8. Procedures for formal studies to be done as part of the master plan are outlined in the master plan prospectus. Study proposals will be sought which will describe specific research procedures.

D. Significance of the Study

As an effort to integrate research conducted elsewhere with current agency policy and apply the results to this particular area, the study has significance for recreation management on the Ranger District and

Forest. One major thrust of the study was defining the role of the Forest Service as a recreation supplier and looking for opportunities to cooperate with other suppliers. While cooperation is hardly a new idea, this study and the master plan for which it laid the groundwork, gave the Hiawatha National Forest some insight into planning and carrying out cooperative efforts and defining roles.

A second major thrust of the study was to integrate and coordinate fisheries, economics and recreation resource management. This seemed particularly critical since the ultimate measure of the success of fish habitat improvement is expressed in terms of the dollar value of resultant recreation use.

The third item related to implementation of the Forest Plan, currently at the printer's prior to release to the public as a draft during the Summer of 1985. The study area falls within Management Goal 7 which emphasizes recreational development. A master plan should be developed to guide management of the Lake Michigan - Brevoort Lake Recreation Management Area.

Chapter 2

CHAPTER II

REVIEW OF LITERATURE

The problem, in a broad sense, is how the Lake Michigan - Brevoort Lake study area should be managed. The author's immediate problem is developing a master plan prospectus and five-year action plan to provide management direction for the study area. To that end, review of the literature from the past two decades in the fields of economics, sociology, psychology and recreation management was conducted. Objectives of the literature review were:

- To avoid the pitfall of intuitive, "seat of the pants," recreation management.
- To familiarize the author and reader with human behavior, user attitudes, motivation and other concepts from the social sciences as they apply to recreation management, surveys, and planning.
- To better understand methods of economic analysis and resource valuation.
- To build upon the concepts learned during the three-week course at Clemson University.

An explanation of the methods used is followed by the review of literature. Six topics were addressed in the literature review:

- Economics and the Value of Resources
- Campground Development Levels - What Do Campers Look for in a Campground? What Should the Forest Service Provide?
- Motivations and Attitudes of Campers and Anglers
- Attitudes and Perceptions of Recreation Managers
- Recreation Planning - The Master Plan Concept
- Recreation Survey Methods

A. Literature Search

The four principal sources of pertinent publications were:

- A SOUTHFORNET computerized search commissioned by the author
- The Recreation Research Publications Bibliography 1961 - 1982 (Echelberger, Gilroy and Moeller, 1983)
- The Outdoor Recreation Management Short Course lectures and handouts
- Forest Service internal documents

The SOUTHFORNET literature search of the AGRICOLA and CAB databases produced 396 citations, of which forty-eight publications were ordered. Cost of the computerized literature search was \$90.07. The "Recreation Research Publications Bibliography" has 932 entries. Sixty-three publications were requested.

Publications were ordered through the National Agricultural Library or requested from the authors. Publications received were reviewed and screened. Articles which did not fit or contribute to the aforementioned six subject groups were omitted.

B. Economics and the Value of Resources

The value of a resource, recreation experience or facility can be estimated, albeit with varying degrees of precision and accuracy. Agency direction is to evaluate economics in decision making. A master plan for the study area will require various types of economic analysis. Management decisions will be strongly influenced by the relationship of demand, costs, and benefits.

This section starts with a look at methods of economic analysis suited to public outdoor recreation management. Examples of economic impact studies are followed by an article on estimating non-economic resource value. Finally the topic of fees is reviewed.

1. Economic Analysis of Outdoor Recreation

Convery (1976) evaluated economics as applied to outdoor recreation. Managers and economists ask different questions and have different concerns. Managers are preoccupied with day to day operations and either don't take the time or don't have the capacity to reflect. Identification of options through economic analysis threatens the status quo and the manager. Skill to analyze, or to evaluate another's economic analysis, is lacking. The author discussed methods of determining costs and benefits. He concluded that the basic tools of economic analysis should be learned by the manager and applied with a positive and open attitude to assist in decision making.

Olsen (1976) in his critique of the previously discussed article by Convery (1976), stated that, "...the results and implications of the work (by economists) have not been effectively communicated to the manager..." The author advocates market analysis to establish a middle ground between economic theory and the mundane problems of recreation management.

Wennergren and Johnston (1977) explained the economic concepts useful for outdoor recreation management. The authors stated that outdoor recreation satisfies individual wants, is subject to the law of diminishing marginal utility, and is in relatively scarce supply. Demand for recreation, expressed as number of trips or visitor days, is a function of variable use costs. The price per unit of recreation is a proxy for market price. Income, tastes and preferences, and substitutes can all shift demand. A commonly used method of demand estimation is "willingness to pay." From an estimate of demand the

consumer surplus is used to measure site value. The authors state, "Consumer surplus, then, is the excess of the expenditures which a consumer would be willing to pay...over that which he actually does pay."

Reiling, Anderson, and Gibbs (1983) have developed a methodology to measure the cost of providing public outdoor recreation.

Cost-of-provision studies are the first step in reducing costs. They point out the need to define the purpose of the study, the objectives of the analysis and the agency's institutional setting.

From the standpoint of economic efficiency failure to charge fees high enough to recover full supply costs can result in overuse and congestion. Expansion of the supply of facilities is a frequent solution resulting in an over-allocation of natural and fiscal resources due to underpricing. As the authors point out, the subsidization of outdoor recreational facilities benefits middle and upper income people. They cite Lewis (1977) who reported the median income of participants in 28 recreational activities to be significantly greater than the general population. They also cite Gibbs and Reed (1982) who found that USDA-Forest Service campground user fees only covered four to eight percent of the total costs of provision of the campgrounds studied. The authors further point out that, "...since user fees usually represent a small portion of recreation participation costs...even zero user fees is an ineffective method of addressing equity issues related to the provision of public outdoor recreation services."

The authors explain how low fees reduce the demand for substitute goods and services. This point is important where the public and private sectors offer similar outdoor recreational facilities in competition with one another.

The cost categories to include for cost of provision studies are:

- The opportunity cost of land
- Capital improvement costs, and
- Operation and maintenance (O&M) costs.

The authors displayed results from eight studies including Gibbs and van Hees (1980) who reported amortized annual capital improvement costs of Forest Service primitive (level 1) sites of \$200 per campsite (1980 dollars) and \$1,600 per campsite for highly developed (level 5) campsites.

2. Economic Impact Studies

Reiling, Cook, and Taylor (1982) investigated the economic impact of ice fishing in Maine. Starting with a random sample of 5,000 resident anglers licensed in 1978 about one third returned the mail questionnaire. Five hundred and forty-six had ice fished in the 1979-80 season and provided data on their ice fishing expenditures. The investigators estimated ice fishing in Maine totaled 600,000 angler days with a mean travel and on-site expenditure of \$12.21 per angler day or \$7.3 million total. With the addition of \$7.3 million for investments in equipment the direct economic impact was \$14.6 million. Indirect impacts owing to the multiplier effect of expenditures as they flow through the economy, added another \$5.4 million. The total economic impact of ice fishing was \$20.0 million or about \$33 per angler day.

Palm and Malvestuto (1983) estimated the value of the sport fishery in a southern reservoir to be \$1,913,000 or \$9.90 per angler-day. Their method of estimating the consumer surplus entailed interviewing 4,344 anglers between 1976-1980 to determine county of origin (distance traveled) and their expenditures.

The value (consumer surplus) was:

- \$30.60 for a bass angler-day
- \$13.40 for a boat angler-day
- \$6.20 for a bank (shore) angler-day.

The investigators found that bank anglers comprise 40% of the total effort in fisherman hours and produce only 25% of the consumer surplus. Boat anglers (which includes bass fishermen) account for the remaining 60% of effort and 75% of the net value. They caution against using this purely economic perspective to measure user-importance.

Blank and Stipe (1970) studied the economic impact of a Minnesota canoe trail. A cooperative effort between clubs, outfitters, agencies and industry led to campsite construction along the 70-mile route and successful promotion of its recreation potential. In 1967 about \$50,000 was added to the local economy. Although not a large sum, the authors tout its value as, "...a nucleus for a developing recreation complex in Wadena County, complementing other recreational enterprises."

Mapp and Badger (1970) published a paper entitled "Input-Output Analysis of the Economic Impact of Outdoor Recreation in a Low Income Area." Focusing on the seven - county Kiamichi Economic Development

District in Southeast Oklahoma with its state parks and man-made reservoirs they found an output multiplier of \$1.18 for each \$1.00 increase in final demand for recreation goods and services. Livestock (1.51), forestry (1.27), food manufacture (1.55) and lumber manufacture (1.25) all had higher multipliers.

Employment was not expected to improve much as a result of recreation development. Twelve of sixteen sectors had higher employment multipliers than recreation (1.12). The income multiplier of 1.07 was exceeded by twelve other sectors. The investigators concluded, "...if the aim of these public programs (reservoirs with recreation developments) is to solve underemployment and unemployment...the employment multipliers indicate that public expenditures to attract manufacturing sector activities will do much more..." They went on to explain that outdoor recreation development in naturally scenic areas has a favorable effect, but not great enough to alleviate chronic unemployment.

Beardsley (1971) delves into "estimating the economic impact" of recreation area development. He emphasizes the importance of clearly delineating the area receiving the impact. New revenues in one location are perceived as a gain, but there may be another area that has lost business. Displacement of users and reallocation of recreation spending from one place to another both can occur.

Benefits to a local area from recreation development are at the expense of alternative uses to which these public or private funds could have been put. Some money received by local businesses, which leaves the area immediately, is called a leakage. Money which stays in the local area often has a multiplier effect as it is respent.

Beardsley compared results from seven studies conducted in different parts of the country. One of those studies by Hughes (1970) in Itasca County, Minnesota estimated total business activity by a dollar sales in groceries to be \$1.18. A dollar in sales of agricultural products resulted in \$2.04 in total spending; a dollar spent in the resort sector created \$2.23 in total business activity. The figures for personal income (per dollar spent) were: \$0.45 for the resort sector, \$0.61 for agriculture, \$1.01 for timber production.

Beardsley concluded that, "Except for increases in land values near recreational developments, most evidence indicates relatively small effects on rural local economies from spending by recreationists." He goes on to qualify this conclusion by stating, "...recreation development may be the best possible means of stimulating the economy of certain local areas. If opportunities for industrial or agricultural development are lacking or limited, a recreation development attracting large amounts of tourist expenditures may easily overcome the disadvantage of the relative smallness of the associated multiplier effects..." Beardsley's article closes by explaining the increased benefits from having a year-long vacation spot with longer visits and higher tourist spending.

Lewis (1975) looks at the effects of vacation homes on local governments with emphasis on Arizona and California. He concludes that the costs to local governments are generally offset by the increased tax revenues resulting from vacation homes. He presents a pathway for the maturation of vacation home developments into retirement communities or year-round subdivisions causing the costs to local governments to increase substantially for access, medical facilities, schools and other social services. If vacation home developments remain seasonal, or if the conversion to permanent residential communities is planned, Lewis feels the benefits to local governments will generally outweigh the costs.

3. Non-economic Resource Values

Taking a different approach to the valuation of resources Arthur (1978) summarized the results of a survey of public attitudes towards wildlife conducted in 1976 by the U.S. Department of Agriculture and the Fish and Wildlife Service. When given a choice of distributing 100 points among wildlife viewing pleasure (defined as "in person or in pictures"), existence value, and hunting opportunity the 2460 respondents averaged 52, 37 and 10 points in each category, respectively. Arthur states, "Furthermore, no significant difference was found between the importance ratings assigned to viewing pleasure by prohunters and anti-hunters ($F=0.41$, P is less than 0.5)..."

Arthur reported that a 1975 U.S. Fish and Wildlife Service survey found the most serious threats to the quality of warmwater fishing to

be water pollution, conflict with boats, habitat destruction, poor land management, and restricted access. Aesthetics and nonconsumptive uses of fish and wildlife were valued highly by the survey respondents.

Driver (date of publication unknown) encouraged recreation resource planners and managers to pay more attention to the human benefits resulting from recreation opportunities. He used the word "benefit" as the user's ability to function more effectively as a result of recreation participation. The improved functioning could result in better performance on the job or at home. Physiological, psychological, and sociological benefits can result from participation in outdoor recreation.

Driver describes five types of knowledge for recreation planning:

- Resource Location - the setting and suitability of the physical resources
- Historical Use - past and current use data
- Economic - scarcity, willingness to pay, benefits and costs of alternatives
- Administrative - Political - the democratic process and agency policy
- Behavioral - reasons why people participate, what they do, what they personally derive, influence of environmental (including management decisions) factors on the recreationist.

Driver called for the integration of these five types of knowledge.

Inventories, research and surveys can fill in information gaps.

Recreation managers are encouraged by Driver to become familiar with research methods used in the social and behavioral sciences to gain confidence in their validity and to put the results into practice.

4. Fees

A great deal of emphasis has been placed on fee collections. A view of the situation in the early 1960's by Argow and Fedkiw (1963) is followed by recent figures and policy.

An interesting article by Argow and Fedkiw (1963) came out of the Outdoor Recreation Resources Review Commission (ORRRC) 1960 inventory of 4,888 publicly owned outdoor "recreation areas." They defined one national forest as a "recreation area" and included state and county parks. In 1959 1,392 recreation areas (28%) charged fees of some kind, camping fees being most common.

Half of the fee areas collected about one-third or less of their operation and maintenance (O&M) costs. One out of seven areas collected fees equal to or greater than their O&M costs. Eighty percent of the 138 areas recouping their O&M costs were in the eastern half of the U.S., with the great majority (108) state operated, followed by 21 local and municipal operations and only 9 federal areas. Recreation user fees totaled \$26 million nationwide in 1959.

Roy Feuchter said at his Outdoor Recreation Management Short Course Presentation that fiscal year (FY) 1983 Forest Service recreation collections totaled \$27.8 million. Recreation special use fees were \$16.5 million and recreation user fees were \$11.3 million. According to the Recreation Information Management (RIM) reports the Eastern

Region of the Forest Service collected \$618,000 in special use fees (4% of the total) and \$1.5 million in recreation user fees (13% of the total). A report issued by the Forest Service Washington Office (Forest Service, Washington Office, 2300 Memo, June 28, 1984) showed the cost of providing recreation opportunities on the National Forests as \$167 million. The \$27.8 million in collections amounts to about 17 percent of the costs incurred.

Feuchter stated that the Forest Service Recreation O&M budget was \$84 million in FY83 with only 29% or \$24.5 million actually spent on the ground to carry out operations and maintenance. A whopping 71% of the O&M budget was tied up in administration.

Feuchter went on to say that the emphasis on fees has peaked. Without new legislation few areas remain to be put under fee. Fees have been raised high enough in the last three to four years to attain comparability with similar state and private recreation areas.

C. Campground Development Levels - What Do Campers Look For in a Campground? What Should the Forest Service Provide?

Recreation providers periodically assess their facilities and their adequacy for both profit-making and policy reasons. A review of published articles, predominantly from the late 1960's to early 1970's, highlight historically important factors. A summary of current Forest Service policy shows where the agency is headed.

Wilbur LePage (1967) attempted to evaluate the success of the 108 private campgrounds in New Hampshire. Both the owners and as many as 1,031 campers provided answers to questionnaires. He found that the percentage of campers who stayed over three days at large campgrounds (70 units or more) was 56 percent, versus 34 percent at small campgrounds. The percentage of campers planning to return was 74 percent at large campgrounds versus 62 percent at small campgrounds. These statistics are significant at the 0.005 level. LePage asserts that, "Few big campgrounds started out big. Most grew in response to the demands of satisfied customers."

Water, particularly lakes and ponds, both attracts campers and results in longer stays. LePage found statistically significant differences (at the 0.005 level) in lengths of stay and number of visits between campers using tents, tent trailers, or travel trailers. Tent campers stay longer and make fewer visits per year than either kind of trailer camper.

Attributes of their favorite campground rated highly by campers were the quality of the facilities, the ability to reserve campsites and maintenance. In an appendix to the aforementioned article the complete questionnaire and results were reproduced. Campers were asked which statements would they use to describe both private and public campgrounds. Public campgrounds rated substantially (statistical analysis was not provided) higher on "outstanding scenery," "attractive natural landscape," "uncertainty of getting a campsite," and "primitive surroundings, few conveniences." Conversely

the private campgrounds were felt to be much higher in "developed with many modern conveniences," "management extremely helpful," and "campground always clean and attractive."

LePage (1968) later published an article on consumer satisfaction in managing commercial campgrounds. Based on studies in New Hampshire during 1961, 1964, 1965, and 1967 he concluded that success is based on capturing new customers and stimulating longer and more frequent visits by old customers. He further documented that self-styled "highly satisfied" campers both stayed longer and planned to return. An abbreviated list of LePage's findings include:

- Direct increases in number of campsites, campground age and investment are accompanied by direct increases in visit length, frequency, and percentage of visitors who plan to return.
- Swimming and boating at or near the campground is associated with longer and more frequent visits and more plans to return.
- Reservation systems lead to longer visits.

Hendee and Campbell (1969) studied the social aspects of camping in three Washington state campgrounds. They found in intensively developed (development level 4) campgrounds that, "rules directed toward environmental preservation directly interfere with the social goals of campers." They also found that the development of modern highly developed facilities by enlarging and upgrading small, primitive campgrounds resulted in the displacement of the original clientele. They recommend locating highly developed campgrounds "...out of the deep woods and (built) closer to main highways."

Cordell and Sykes (1969) interviewed campers at the Forest Service's Indian Boundary campground in Tennessee during 1966 and 1967 to

determine user preferences for developed-site camping. Reasons given for coming to the campground were headed by "the lake" followed by "mountain scenery" and "nearby trout streams."

Of six facilities, the most important was "clean comfort station" followed by "bathhouse with hot showers" and "campstore." Other questions yielded responses favoring well-spaced, adequately screened, shaded campsites within 200 feet of a comfort station and 100 feet of a water hydrant.

In a later study at the same campground Cordell and James (1972) went into more depth, using statistical tools such as multiple regression and data from 1966-1970. During this five-year study period 1,133 usable interviews were obtained from campers. When asked which of 14 campsite characteristics were most important in selecting a campsite the top three responses were:

- Nearness to comfort station
- Amount of shading
- Nearness to water hydrant.

Lime (1971) in his study, "Factors Influencing Campground Use in the Superior National Forest of Minnesota" found that over three-fourths of his subjects were looking for waterfront campsites. Fishing was a reason emphasized by campers for visiting the area and staying at a lakeshore campground.

Moeler, Larson, and Morrison (1974) interviewed 281 boaters and 157 campers on the Allegheny Reservoir on the Allegheny National Forest in

Pennsylvania during 1971 to find out their opinions about management policies. The question on camping facilities showed statistically (at the 0.10 level) that the following groups wanted more facilities:

- People from urban backgrounds
- Those from groups of three or more adults
- Mobile home users
- Those who stayed 3 nights or less
- Those who stayed 8 nights or more
- Those who had been coming to the area for at least two years.

Six out of 10 boaters wanted more facilities such as docks, launching sites, and marinas. The facilities desired by campers were:

- Flush toilets
- Hot showers
- Electric and water connections
- Concession facilities.

Half the boaters opposed any launching fee. Those favoring a fee felt it would be justified only if existing facilities were improved.

Campers also felt that higher fees were justified only if additional facilities were available. Fifty-six percent of campers felt that the then current fee of \$2 per night should not be raised.

Magill (1976) investigated what campers liked and disliked about two pilot reservation systems used by the Forest Service and Park Service in California in 1973. He found that, "Sixty-one percent of those users who had stayed at the same campground both before and after reservations were instituted had a more enjoyable experience with reservations."

As campground managers the Forest Service is seeking to maintain or lower the level of facility development. As expressed by Roy Feuchter, Jay McConnel and John Shilling of the Forest Service's Washington Office during the three-week 1984 Outdoor Recreation Management Short Course, the agency is facing:

- Tighter recreation budgets
- A \$298 million dollar backlog of deferred maintenance
- Emphasis on increasing revenues relative to expenditures
- A very high (71% of the Recreation Operation and Maintenance budget) percentage of available funds for administration

There is strong resistance in the upper echelons of the agency to providing higher development levels (particularly levels 4 and 5) or competing with the private sector. All three speakers favored concession operations and use of volunteers and human resource program enrollees to lower costs.

In Region Nine, Dick Joy identified areas of concern in recreation management for the fall Management Team Meeting in September 1984 (Forest Service - R-9, 1984). He called for emphasizing facility development levels 1, 2 and 3. He proposed phasing out level 4 and 5 sites over time by removing sewage treatment plants (replace with vault toilets), removing electrical service and hot showers, and removing visitor centers and other facilities if not justified through measured benefits.

Joy further called for less private sector competition by establishing user fees at or near private sector rates, encouraging development of private entrepreneurs on adjacent available private lands, and

promoting concessionaire operations. These managers feel that the agency's desire to be "Everything" for "Everybody" has led to inappropriate public expectations and high operation and maintenance costs. They recommend phasing out inappropriate facilities and learning to say "no." Feuchter (1984) in his March 30, 1984, speech during Colorado State University's Natural Resource Days stated that, "The quality of the facility isn't lacking, but the quality of the experience is (emphasis his)." He also emphasized the need for the Forest Service to more clearly define our role, "...and then agree not to compete with the others." Forest Service Chief R. Max Peterson (1984) in his address to the American Recreation Coalition said, "... (we) do not want to compete with the private sector by building elaborate facilities that they could provide or which are inappropriate for the forest setting."

The Mount Rogers National Recreation Area (NRA) is an example of recently planned Forest Service recreation developments. Even within this congressionally established NRA located in the Jefferson National Forest in Virginia no level 5 campgrounds currently exist or are planned (USDA-Forest Service, Southern Region, 1980). The plan calls for the creation of 12 new level 2 campgrounds (225 sites) within twenty years. During the same period level 3 and 4 sites will increase by 65 and 663 sites, respectively. This demonstrates a strong commitment to managing the NRA with both level 2 and 4 developments, with no provision for level 5 campgrounds.

D. Campers and Anglers Motivations and Attitudes

From the Outdoor Recreation Management Short Course and literature searches done for this project a number of publications were reviewed that addressed attitudes and motivations of users. Some studies are philosophical or theoretical and others are empirical surveys of attitude and preferences. Both types have been reviewed and summarized in the following section. Studies of user preferences for facilities and improvements are cited in Chapter II, Section C.

Driver and Knopf (1976) identify temporary escape from problems as an important reason people fish. Their studies in Michigan use Experience Preference Scales administered to over 5,000 respondents to determine the importance of different items or reasons to recreationists. Half to two-thirds of 600 Au Sable River fishermen in 1972 felt that "to feel free," "chance to escape city," "escape city noise," "change from routine," and "breathe clean air" were extremely or very important reasons for fishing that river.

Over two hundred fishermen and four other types of Michigan recreationists were asked to what degree twenty conditions such as noise, crowdedness, safety, privacy, mental exhaustion, etc. applied to their neighborhoods and work environments. Scores indicate that people who rated their neighborhoods low in physical and social quality place a great importance in their recreation experience to help them escape physical stress. People who feel their jobs are demanding are seeking to "slow down mentally," while those whose jobs are routine are seeking "change" and relief from "physical stress."

Moeller and Engelken (1972) interviewed 100 fishermen at the Heiber Memorial Forest Fishing Ponds in New York State. These fishermen felt that water quality, natural beauty, and privacy while fishing were all more important to their overall enjoyment than size or number of fish caught. The authors concluded that "...fishery management should be broadened to incorporate environmental management, if quality fishing experiences are to be provided."

Hobson Bryan in his Outdoor Recreation Management Short Course presentation on "Conflict Resolution" pointed out the need to observe behavior of users. He gave an example in trout fishing wherein highly specialized fishermen can be found who value the resource setting and recreational experience over consumption of fish. Specialization is a phenomenon resulting in people ostensibly engaged in the same activity (fishing) to have widely divergent and conflicting motivations, attitudes and behavior. Bryan advocates what could be construed as an elitist approach to the problem - cater to the most highly specialized participant because less specialized fishermen can be easily satisfied in a wide range of settings, but the specialist can not.

Lucas (1965) looked at data from a survey of recreationists in the Quetico-Superior area of Minnesota and Ontario to determine the importance of fishing. He found a large variation with many motorized canoeists (67%) and boat campers (48%) rating fishing as a reason they visited the area compared to only sixteen percent of the paddling canoeists.

Seventy-two percent of resort guests rated fishing as their most important activity in the area. Between 30-46 percent of the motorized canoeists, day users, auto campers, boat campers and private cabin users listed fishing as their most important activity. The figure for paddling canoeists was 8 percent.

LePage (1967) in contrasting results of a survey of 445 New England commercial campground visitors with 421 public campground visitors found that interaction with other campers was more important to the commercial campground visitors. They were much more likely to have sought and followed the advice of others in selecting a campground and were much more likely to belong to a camping organization.

Rich Schreyer in his Outdoor Recreation Management Short Course presentation on the "Sociology of Recreation" discussed the "Escape Model." People in environments where the quality of life is low use outdoor recreation as an escape from stress. Ann Saterthwaite (date of publication unknown) in her article "Some Functions Recreation Will Play For The Individual In The Future" feels that self-fulfillment, self-testing and skill challenging, and self-forgetting and escape will become increasingly important functions of recreation.

Stankey (date of publication unknown) touts the Recreation Opportunity Spectrum (ROS), "...to fulfill the many needs, motivations and preferences that lead people to participate in outdoor recreation." The concepts of recreational preference, substitutability, and carrying capacity help to explain how motivations and attitudes translate into behaviors and experiences.

E. The Attitudes and Perceptions of Recreation Managers

During the Outdoor Recreation Management Short Course, and subsequently in conducting the review of literature for this project, several lectures and articles addressed the way managers perceive the recreation resource they manage. Attitudes can become biases and biases can creep into policy formulation. A manager is well-advised to be aware of his/her attitudes, particularly when they differ radically from the recreation user's. Focusing on the management of recreation experiences, as defined by user attitudes and behavior, can compensate for bias. In setting objectives for recreation planning, and later in plan development and implementation, it is important for recreation managers on the Hiawatha National Forest to be as objective as possible.

Driver and Brown (1975) called for recreation demand analysis, rather than reliance on managerial intuition, to plan outdoor recreation. They suggested a behavioral approach with a resultant view of recreation as an experience. Their "recreation production line" concept extends beyond merely creating recreation opportunities - a stopping point for many recreation professionals. For example, the second-stage product beyond the trout fishing opportunity is trophies or meat. Beyond that perceived benefits are, "skill development, food, status, exercise, rejuvenation, etc." The authors show, "increased self-confidence, sustenance, enhanced productivity, health, etc." as the ultimate social and individual benefits.

Managerial relevance of recreation experiences can be defined by:

- The significance of the user group
- The agency's mission and administrative jurisdiction
- How apparent the social benefits are
- User willingness to pay
- Social acceptability

They caution against the "pack them in" philosophy - if use is increasing the manager must be doing something right. Crowding may cause a decline in the quality of the experience or the displacement of unfulfilled users. Each outdoor recreation agency should not try to provide, "...opportunities for every type of experience for all users." They concluded, "...better measures are needed of what it is we really are producing when we provide recreation opportunities so that we can determine what recreation experience opportunities should be provided for whom, by whom, where, when, and at what price."

The following article was based on research in a number of campgrounds. It provides specific examples of the manager - camper dichotomy.

Clark, Hendee, and Campbell (1971) presented a discussion of changing campground patterns, camper and manager attitudes, and a strategy to avert problems. Many highly developed campgrounds evolved from small, primitive campsites. The style of camping and its appeal also evolved into less contact with nature and greater social contact.

Displacement of campers seeking a primitive setting may occur. The behavior of those not displaced becomes suited to the highly developed

and crowded recreation setting. The investigators stated, "It is ironic that despite the highly developed nature of modern campgrounds, traditional views of camping form the basis for most campground rules and regulations and constitute managers' expectations of appropriate campground behavior."

Research was conducted in eight large, highly developed national forest, state park, and national park campgrounds in Washington State. Mail questionnaires were sent to recreation managers of the aforementioned agencies. Their data analysis was nonstatistical with a focus on "substantive importance." Very important reasons for camping by campers were listed:

- "Teaching my children about the out-of-doors"
- Enjoying "solitude and tranquility"
- Appreciating "unspoiled beauty"

Managers, on the other hand, thought only half as many campers in these highly developed campgrounds had those motivations.

Questions about additional rules, noise, use of city conveniences, motorbike use in campgrounds and people camping at an adjacent site showed that managers thought campers would be bothered by these items much more than they were. Stricter enforcement of rules would not detract at all from the camping experience of four-fifths of the campers surveyed. Managers thought that half the campers would respond that stricter rule enforcement would detract "somewhat" or "a great deal."

When it came to identifying campground problems there were wide differences between campers' views, managers' perceptions of campers' views, and managers' own views. Nine out of ten managers felt that littering, nuisance behavior, theft, and vandalism were either major problems already or were becoming more so. They also felt that eight out of ten campers shared their views. However, only four out of ten campers thought the aforementioned four items were currently problems.

The investigators concluded that, "The problem we see highlighted in our data is the different expectations held by managers and modern campers." They suggested that the expectations of campers are legitimate and that managers should be more accommodating.

Lime (1972) cautioned against managerial biases and the tendency to plan facilities for the non-existent average user. Multiple publics with a range of wants are the rule. The author pointed out that resource managers lacked backgrounds in the behavioral sciences. They tended to be "experts by participation" when it came to camping, hiking, fishing and hunting. The result was "seat of the pants" decision making without knowing public attitudes. Lime asserts, "...knowing how various publics define a satisfactory recreation environment gives management the basis for more viable and defensible decisions."

Wellman, Dawson, and Roggenbuck (1982) sampled both managers of/and visitors to Cape Hatteras National Seashore and Shenandoah National Park, comparing visitors stated motivations to managers' predictions

of those motivations. At Cape Hatteras off-road vehicle (ORV) users and non-users were given questionnaires to rate their motivations for visiting the area. Forty-one management personnel independently predicted what they thought ORV users and non-users would list as motivation items. An even more complete use of Driver's motivation scales (a 55-item battery) was done with Shenandoah National Park backcountry visitors and park managers.

The results demonstrated that, "Managers at Cape Hatteras National Seashore were substantially inaccurate in their predictions of both pedestrian and off-road vehicle users." Managers perceptions were significantly different (P is less than or equal to 0.01) from both pedestrians and ORV users in 8 of 11 categories. They underestimated the importance of "escaping pressure," "enjoying scenery," and "in-group contact." With ORV users managers underestimated the value of "family togetherness" while overestimating its value for pedestrian visitors.

Managers at Shenandoah National Park, "...were relatively accurate in their estimations of visitor motivations." Eight out of 25 comparisons showed significant differences (P is less than or equal to 0.01) between the managers' perceptions and the backcountry visitor's expressed motivations. All eight mispredictions were underestimates including "reflect on personal values," "creativity," "meeting/observing new people."

The investigators acknowledged the difficult task facing the managers of trying to second guess other people's motivations. They cited other studies to support their hypothesis that, "...the contemplative ideal of outdoor recreation plays a major role in determining the degree to which managers at different kinds of areas are able to assess the reasons their visitors give for their activities."

More traditional users of the more traditional national parks (backcountry visitors at Shenandoah National Park in this instance) tend to better fit the contemplative recreation ideal derived from Muir and Olmstead, and ingrained as a basic tenet of the National Park Service. The hiker quietly communing with nature fits the contemplative ideal. A trail biker kicking up a "rooster tail" does not. The investigators suggested taking a closer look at visitors, such as ORV users, most removed from the traditional ideal. An evaluation of the behavior of a wide range of visitors to correlate it with their expressed preferences was also suggested.

O'Leary (1984) discussed the significance of social change to recreation management. "Trained incapacities" or "self-concept" results when a manager with more experience, training or different values than a visitor erects personal or professional filters which screen out important information. He suggested being aware of bias, actively soliciting information from users and recognizing that differences exist between the values of managers and visitors. The author cites Burch (1965) who described the tendency of campers to move furniture, construct new "furniture" from natural materials and stockpile firewood. The camper engaging in this behavior thinks it

appropriate while the manager would view it as causing additional work to make the campsite "orderly" again.

O'Leary pointed out the increasing number of people who have little experience with the natural environment. They have few guidelines on appropriate recreation behavior. Resource management organizations may end up teaching about living in and with the natural environment.

He sees an increase in highly educated, underemployed people who will seek the fulfillment lacking in their jobs through recreation. They will likely pursue a wide range and type of activities with an intensity surprising to a manager who is not in tune with the user's motivations.

F. Recreation Planning - The Master Plan Concept

To develop a prospectus for a master plan of the study area several examples of master plans done by the Park Service and Forest Service were evaluated. A review of these pertinent publications follows.

The Final Management Plan and Environmental Impact Statement (EIS) for the Mount Rogers National Recreation Area (NRA) (USDA-Forest Service, Southern Region, 1980) in Virginia was obtained from Mr. Charles Huppuch of the Forest Service's Southern Region. The plan covered a ten-year period to implement the preferred alternative of the EIS. The effects of implementing the plan were discussed and mitigated for:

- Soil
- Water
- Vegetation
- Wildlife
- Fisheries
- Visual Resources
- Air
- Noise
- The socio-cultural environment
- The economic environment

The final EIS considered seven alternatives:

- Conventional National Forest Management
- High Density Recreation Development
- Low Density Recreation Development
- Maximum National Development
- Management as a Preservation Area
- The Draft EIS proposal
- The Final EIS proposal

The Plan and EIS were carefully thought out and well written, incorporating the concerns of 479 respondents during public involvement.

The Draft EIS dealing with the recreation development level for facilities on 2200 acres at the summit of Mt. Magazine on the Ozark National Forest in Arkansas (USDA-Forest Service, Southern Region, 1979) described four alternatives. The options ranged from a \$3.0

million alternative to rebuild the lodge which burned in 1971 and to add a swimming pool, tennis courts, restaurant, water line, sewer system, expand the campground, build trails and overlooks, etc. on down the development scale to a \$40,000 alternative to maintain existing facilities. The preferred alternative substituted cabins for a lodge while retaining most of the other developments for an estimated cost of \$2.65 million. Consultations with state and local agencies and elected officials seemed to play a major role in the development and selection of alternatives.

The Final EIS and Management Plan for the Flaming Gorge NRA in the Ashley National Forest (USDA-Forest Service, 1977) considered alternatives ranging from less development than present up to "maximum development and use." The proposed management plan divided the 185,000 acre NRA into management areas and units. Each individual area has specific management direction.

For the St. Croix National Scenic Riverway (USDI-National Park Service, 1976) the Final EIS and Master Plan focused on cooperation between the Park Service, Wisconsin and Minnesota. Issues addressed were land acquisition, access control, preservation zones, facilities and trails. As in other master plans public involvement played a major role.

In the Voyageurs National Park Final EIS and Master Plan (USDI-National Park Service, 1980) the main issue was motorized use. The master plan defined objectives, established development patterns, and provided guidelines for future management.

The Hiawatha National Forest is finalizing its Land and Resource Management Plan and EIS for 1986 - 1995 (Forest Plan). A preferred alternative, subject to internal review and public involvement, is emerging which highlights the author's study area for special management with emphasis on recreation (refer to the maps in the end flap envelope - Appendix H, Figures 1 and 2). The Master Plan Prospectus (Appendix F) outlines the objectives and sideboards for the Lake Michigan - Brevoort Lake Recreation Management Area. A master plan will be tiered to the Forest Plan which provides broad management direction. The master plan will occupy the middle position in the hierarchy of:

- Forest Plan
- Master Plan for the Lake Michigan - Brevoort Lake Recreation Management Area
- Project Plan(s)

In the White Mountains NRA in Alaska Tobin (1983) has started to use the Recreation Opportunity Spectrum (ROS) system to aid in development of a land-use plan for the NRA. The five steps he outlined are:

- Step 1 - Identify Planning Goals and Constraints:

- Legislation
- Policy
- Current Resource Management Situation

- Step 2 - Identify Issues and Concerns:

- Public Involvement
- Interagency
- Intra-agency

- Step 3 - Inventory Existing Conditions:

- Physical
- Social
- Managerial
- Seasonal

- Step 4 - Identify the Proposed ROS Classes:

Management Objectives
Activity Types
Facilities
Experiences

- Step 5 - Action:

Implement
Monitor
Revise

The steps proposed by Tobin have a place in the development of a master plan for the Lake Michigan - Brevoort Lake Recreation Management Area.

Osborn (1976) of the Department of Agriculture's Economic Research Service evaluated the impact of the Spruce Knob - Seneca Rocks NRA in West Virginia. Visitation projections, economic benefits, land uses, and employment opportunities were evaluated. His methodologies have some applicability to the master plan for the author's (Beauvais') study area.

G. Survey Methods

Much of the literature on survey methods, principally questionnaires and interviews, has its origins in the social sciences. An in-depth review of survey methods is beyond the scope and purpose of this paper. An indication of the depth of the subject over a decade ago is Potter, Sharpe, Hendee and Clark's (1972) annotated bibliography on questionnaires with 193 references from 48 sources.

The problem of developing a master plan prospectus can be best addressed when sufficient information is available. Timber inventories are completed. Fisheries data is being collected on Brevoort Lake as part of the Brevoort Reef monitoring and MDNR creel census. A vegetative management plan is needed. Data on fee collections and use in campgrounds are adequate. Lacking are a site-specific economic evaluation of costs and benefits and user surveys to gain an understanding of the behavior, motivations, attitudes and preferences of current and prospective recreationists.

Hammit and McDonald (1982) used a 15-page mail questionnaire to collect additional data from inner tube floaters who had completed a one-page contact questionnaire as they left one of two Tennessee rivers. The initial response rate averaged 29.4 percent with two follow-up mailings increasing that figure to 42.5 and 52.2 percent. Based on the assumption that a 50 percent response rate is barely adequate, the investigators determined whether late respondents differed from early respondents and whether respondents differed from nonrespondents.

They concluded, "...a 30-percent return rate appears to be sufficient to represent our sample." They further caution, "...we are not advocating that 30-percent response rates are adequate in recreational surveys." In this study, early respondents were not particularly different from late ones, nor were nonrespondents different from respondents.

Moeler, Mescher, More and Shafer (1980) advocate the use of informal interviews of campers to validate research data collected through formal interviews and questionnaires. They found major differences in expressed willingness to pay. In a formal interview fewer than one out of five respondents said they would pay an additional dollar per night to camp. The informal interview procedure produced a statistically significant difference (P less than or equal to 0.005) with one-half the respondents willing to pay an extra dollar per night to camp. The results held true across a wide range of camper characteristics including age, sex, experience, distance travelled, and type of equipment. The difference in response was attributed to the type of interview.

James, Wingle, and Griggs (1971) conducted a study to estimate recreation use on two lakes in Oregon. Methods used were aerial observation, aerial photographs, counts of boats from the ground using binoculars, and interviews with boaters at boat landings. They found ground based methods cheaper and more reliable for determining number of people per boat. With a large irregularly shaped lake with many launch sites aerial observations may be useful, although expensive. As was the case in their study, the investigators favored a ground-based, cooperative effort between fisheries managers conducting a creel census and recreation planners.

As early as 1958 campground registration data were being collected and used to determine visitor use and characteristics (Bury, 1964). He

recommendations grouping visitor trends by comparing within a community and comparing both trends over time as well as differences between communities.

of protecting the resource (Goggin and McCool, 1974) rather than of enhancing experiences for the visitor while maintaining a quality environment." Managing behavior is not a technical problem - it must be looked at within the context of human values.

Giving people what they want may not be as simple as it seems according to Schreyer. Stated preferences may differ from actual behaviors. Preference surveys may be ambiguous with no clear trend.

Schreyer listed three barriers to applying research:

- Disagreement between managers and researchers as to what constitutes useful information
- Unrealistic management objectives
- Political realities

Managers may find questionnaire results to be "nice - but so what?" A manager's inability to define a problem can result in gathering lots of useless data. A researcher's unwillingness to structure research towards useful applications can result in abstract research irrelevant to decision-making.

Manager's tendency to focus on recreation activities rather than experiences can result in misunderstanding users. Schreyer's examples included a rock climber viewed by a manager as engaging in a dangerous activity being subjected to regulations to make his/her sport safer. The rock climber may well have been seeking challenge and risk to gain a meaningful recreation experience. Backpackers ostensibly engaged in the same activity may actually be seeking the incompatible experiences of solitude or social interaction.

Schreyer's key issues for survey development are:

- Who should be sampled?
- Is survey research valid for public participation in decision-making?
- Can survey research help resolve conflicts?

He cautioned against only sampling current users at a point in time. Trying to sample non-users is logistically difficult. Sampling users of a site over time - a longitudinal study - may detect changes a "one-shot" study would miss.

Schreyer discussed similarities between public hearings or content analysis of letters and user surveys. He cautioned against selective use of survey data to rationalize a decision.

Shafer and Moeller (date of publication unknown) discussed wording questions in public opinion surveys. They recommended simple questions, free of bias, with understandable terms. Respondents, not wanting to appear ignorant, think they understand a question and will make a choice. The authors stated, "...the more meaningless (or less

understood) the question, the more likely it is to produce consistent responses when repeated (emphasis theirs)."

They recommended considering possible alternative answers. Including two alternative answers in the question can drastically alter results by reducing bias.

In their example on clearcutting Douglas-fir one group of social science students were asked:

"Do you think most foresters who clearcut Douglas-fir, and thus cause unsightly slash and bare areas, could change their cutting methods to avoid aesthetic damage?"

73% said foresters could change
20% said they couldn't
7% had no opinion

When a similar group of students were presented with an alternative by adding the underlined words:

"...avoid aesthetic damage; or do you think that the unsightly slash and bare areas are unavoidable in order to cause new Douglas-fir to grow there again?"

The results changed to:

38% said foresters could change
45% said they couldn't
7% had no opinion

Words such as "should," "could," and "might" drastically alter the connotation of a question from a moral issue (should) to a possibility (could) to a probability (might). In the aforementioned clearcutting question 59% said something should be done, 38% something could be done, and 30% said something might be done. They suggested having a "no opinion" or "don't care" option to avoid forcing a choice on people who may not feel strongly one way or the other.

In summary their recommendations were:

- Carefully choose words
- Don't take things for granted
- Be critical in judging results of surveys using inappropriate techniques

The Allegheny National Forest (as presented at the Fall 1984 Region 9 Management Team Meeting) has developed and used a Campground Service Response Form (Appendix A, Figure 3). Although an informal survey method, it provided feedback to managers. The investigator (Beauvais) has adapted the method to estimate response rate while conducting a post-project survey during the summer of 1985. Refer to Chapter III and Appendix A, Figures 1 and 2.

The survey methods used in the past and proposed for the summer of 1985 by the investigator are described in Chapter III. Michigan Department of Natural Resources methods for conducting their ongoing creel census are also described therein. Methods for surveys proposed as part of developing a master plan for management of the study area are discussed in Chapter IV and outlined in the Master Plan Prospectus (Appendix F) and the St. Ignace District 5-year Action Plan (Appendix G).

Chapter 3

CHAPTER III

PROCEDURES

Recreation management opportunities and problems require data for their solution. Formal studies, including research surveys, are one way to collect such data. Informal studies, compilation of historical information, discussions, and the literature are other methods to gather, make use of, or get by without data. For the purpose of developing this master plan prospectus the latter course was followed. The master plan will necessitate a formal study to collect data for management needs and to corroborate the assumptions of this project.

Since no formal study has yet been done specifically for this project, the procedures discussed refer to either:

- The post-project camper survey planned for the summer of 1985
- The creel census of Brevoort Lake anglers being done by the MDNR in cooperation with the Hiawatha National Forest
- Recreation use data and informal camper surveys done by ranger district recreation personnel
- Benefit/Cost Analysis

Each of these four will be discussed in turn.

A. The Subjects - Post-Project Camper Survey

The post-project survey respondents will be campers at Brevoort Lake and Lake Michigan campgrounds during the summer and autumn of 1985.

The subjects will self-select on the basis of their willingness to take a response form from the self-service pay station, complete it, and deposit it at the pay station before departing. Campground compliance checking officers will be informed of the survey to be able to answer questions, but they will not solicit respondents. Notices explaining the survey will be put on all campground bulletin boards. The choice of whether to respond or not will be voluntary without follow-up efforts by the Forest Service.

B. Instrumentation and Collection of Data - Post-Project Camper Survey

Appendix A, Figures 1, 2, and 3 are the instruments developed by the author and the Allegheny National Forest. The instrument is to gather comments or responses to improve campground management and to get public involvement from transient out of town users. These campers may be interested in Forest Service management, but often cannot attend public meetings or respond to articles in the local papers. Statistical validity and replication of results are being intentionally foregone.

C. Treatment of Data - Post-Project Camper Survey

Response forms will be numbered consecutively, collected daily along with fees, and date stamped. Forms which have the respondent's name and address will necessitate a Forest Service reply within three weeks. These will be assigned to an employee to draft a response and will be returned in the proper numerical sequence along with a copy of the reply sent. No later than March 1986 a complete tabulation and

summary of comments will be completed. Like responses will be grouped, the number tabulated, direct quotes of typical comments will be highlighted and a narrative summary for each response category will be prepared.

From past experience, and the schedule for opening and closing the water distribution system, it is felt there are three use seasons:

- Early Season (April to Mid-June)
- Summer Season (Mid-June to Mid-August)
- Late Season (Mid-August to December)

Following initial grouping of like responses the response forms will be separated by use seasons and a comment summary and response rate estimate will be done. Response rate will be estimated from information on the fee envelopes (Appendix A, Figure 4). Ten percent of the fee envelopes for each use season will be checked to estimate the camper's expected length of stay. Since both arrival time and estimated departure time are entered by the camper, expected length of stay can be calculated. The average length of stay for each use season will be divided into the total number of site-days tallied as part of counting fees. The quotient is an estimate of the number of camping parties who used the campground. A maximum of one response form per party is assumed. Comparison with the number of response forms collected during the same period will provide an estimate of response rate.

D. The Subjects - MDNR Creel Census

Participants in the creel census are fishermen interviewed as they complete a fishing trip on Brevoort Lake and return to shore. The creel census began January 2, 1985, and will continue for one year.

E. Instrumentation and Collection of Data - MDNR Creel Census

Appendix B, Figures 1 and 2 are the instruments developed by the MDNR and the investigator. The rationale for using the MDNR creel census forms was the MDNR's, based on their procedures and experience. The second page of Appendix B, Figure 1 - was developed by the investigator to provide information for recreation management of the lake and obtain public involvement.

Data collection followed the work schedule of the creel census clerk (Appendix B, Figure 3). Counting times shown on the schedule are when counts of boats, ice shanties, open-ice fishermen and shore fishermen begin. Due to the lake size and shape, counts have to be made from four vantage points in the winter and six in the summer. During the winter poor visibility and unplowed roads made counting difficult. The mobility of ice-fishermen on snowmobiles made it difficult to conduct interviews as they stopped fishing and left the lake. The driving distance between opposite ends of the lake is nine miles.

The creel census clerk was hired and trained by the MDNR. His work station was the Forest Service, St. Ignace Ranger District Office.

F. Treatment of Data - MDNR Creel Census

Upon completion of the creel census the MDNR will analyze all the data and produce reports summarizing biological parameters and fishing use. Appendix B contains an example of creel census results for a similar lake in Mackinac County. This investigator will tabulate and summarize the responses to the interview questions (Appendix B, second page of Figure 1) by March 1986.

G. Subjects - Informal Recreation Surveys and Use Data

The subjects in these surveys were campers present at Brevoort Lake and Lake Michigan Campgrounds on 4 non-consecutive days during June, July or August in 1981, 1982 and 1984.

H. Instrumentation, Collection and Treatment of Data

The District recreation personnel who operate and maintain the campground developed questions which they administered during a structured interview. Due to the informal methods employed the data do not lend themselves to statistical analysis. The sample was not randomly selected. The information, including impromptu comments from campers, has been grouped by campground and displayed in its entirety in Appendix A. A summary table is included in Chapter IV as part of the data analysis.

I. Subjects, Instrumentation, Collection and Treatment of Data - Benefit/Cost Analysis

Several possible projects within the study area were subjected to a simple benefit/cost analysis to provide an indication of their economic merits. The proposals were:

- Stabilization of eroding sand dunes and habitat improvement on the south shore of Brevoort Lake
- Conversion of a picnicking and swimming area on Brevoort Lake to group camping
- Conversion of a paved parking area in Lake Michigan Campground to recreational vehicle (RV) sites with full hookups
- Same as above but with electrical hookups only
- Adding electrical hookups to 10 campsites in Brevoort Lake Campground

Costs of the Brevoort Lake south shore stabilization project were estimated by Scott Lidgard, A Forest Service Volunteer in August 1984. He consulted with the investigator and the Forest engineering staff and was able to use cost data from the ongoing Brevoort Lake reef project. The investigator adjusted the cost estimate upward to account for a modification of Lidgard's proposal advocated by the fisheries staff.

Benefits were expressed as increased recreational use attributable to the stabilization project by the Forest fisheries and wildlife biologists. Resources Planning Act (RPA) values for the Eastern Region for summer and winter (ice) fishing (\$16.30 and \$19.95, respectively) and waterfowl hunting (\$24.00) were used. Project lives of 20, 50 and 100 years were tried.

For the remaining projects costs estimates were adopted from proposed capital investment projects with O&M costs included. Benefits were based on occupancy estimates from historic and projected use and fees of \$7 per night for sites with electrical hookups, \$9 per night for RV sites with electrical, water and sewer hookups, and \$20 per night for group camping.

The data were run through the INVEST III program using interest rates (discount rates) of 3, 4, 10 and 15 percent. Discounted benefits and costs for the life of the project were compared and the following were calculated:

- Net present worth (NPW)
- Annual equivalent value of NPW
- Benefit/Cost ratio
- Internal rate of return

Refer to Appendix C for a complete set of results.

Chapter 4

CHAPTER IV

ANALYSIS OF DATA

As a colleague in the Forest Service was fond of saying, "There are no problems, just opportunities." With that optimistic attitude in mind the intent of this study was to define a range of opportunities and chart a course to attain them. The Lake Michigan - Brevoort Lake area is as varied in its natural features as it is in the recreation opportunities it offers. The master plan concept was applied to the study area to allow for a holistic approach. Recreational synergy occurs when complementary and compatible experiences are available to users. Developed recreation opportunities in rural campgrounds and resorts are complemented by a nearby hiking trail offering a semiprimitive recreation experience. Snowmobiling to a favorite ice fishing spot on Brevoort Lake and cross-country skiing in the forested sand dunes three miles distant can be enjoyed by the same or different individuals in one day without conflict.

The analysis of data begins with the informal surveys. A summary of use data from fee collections follows. The benefit/cost analysis is next. Following those sections the remainder of the chapter is devoted to an analysis of information judged by the author to be

relevant to the study. Preparation of the master plan prospectus (Appendix F) resulted from the literature (see Chapter II), public involvement, the analysis of benefit/cost and use data, and discussions with co-workers. The Student Project Prospectus submitted in October 1984 set the sideboards.

A. Brevoort Lake and Lake Michigan Campground Visitor Survey

The user-profile which resulted from informal surveys on four days over a period of three years was a snapshot of the summer use season visitor. The picture that emerged of the Brevoort Lake camper is of a long-term, repeat customer who stayed an average of about a week. Looking further at the data (see Table 1) the Brevoort Lake Campground visitor was often staying in a trailer or recreational vehicle. Almost three out of four had some kind of boat. Only one out of ten visitors to the Lake Michigan Campground had a boat. Seven out of ten were staying in tents. About half were repeat customers staying for about four days.

Without benefit of statistical analysis, inferring too much from the data would be unwise. However, it is the investigator's opinion that the information is substantially correct. The percentages of campers with boats made sense considering that Brevoort Lake Campground offers good fishing, has a boat ramp, and consists mostly of lake front campsites on an inland lake. The Lake Michigan Campground is within high dunes (about 40'), with no fishing opportunity, no boat ramp, and on a large, treacherous body of water.

Table 1

Characteristics of Brevoort Lake and Lake Michigan Campground Visitors

	<u>Brevoort Lake</u>	<u>Lake Michigan</u>
Total Number of Structured Interviews	117	43
Total Number of Persons in Interviewee's Groups	460	175
Average Size of Group	3.93	3.43
Percent Repeat Customers	73%	56%
Average Number of Years Visited	8.8 years ¹	N.A.
Average Length of Stay	7.5 days ²	4.09 days
Percent Camping in Tents	33%	70%
Percent Camping in Truck Campers or Trailers	56%	18%
Percent Camping in Motorhomes	11%	12%
Percent With Boats and/or Canoes	73%	9%

¹ Based on 24 interviews² Based on 32 interviews

The most popular sites at Lake Michigan Campground are located up a flight of stairs from a small parking space and do not accommodate trailers. Brevoort Campground has larger, flatter sites with level trailer pads. Lake Michigan Campground is located right on U.S. Route 2, a busy east/west thoroughfare. The Michigan Department of Transportation (MDOT) has taken traffic counts on U.S. 2 at the town of Brevoort, four miles west of the Lake Michigan Campground. A summary of the results are displayed in Table 2. Forest Service traffic counts have been taken on the road turning off from U.S. 2 (Brevoort Lake Road #3108, see Appendix H, Figure 2) and the Brevoort Campground Road (#3473, see Appendix H, Figure 2). The average daily traffic on U.S. 2 (ADT) during the months of July and August for 1975 - 1984 was 5562. During August 1979 the ADT on U.S. 2 at Brevoort was 5329. For the period August 24, - September 1, 1979, the ADT on the Brevoort Lake Road (Road #3108), was 223. Of the total traffic on U.S. 2 about four percent turned off the highway and onto the road leading to the Brevoort Lake Campground turnoff. A traffic counter placed on the road leading directly to the Brevoort Lake Campground (Road #3473) recorded an ADT of 398 during June 24, 1982, through November 8, 1982.

The volume of traffic on U.S. 2 in the summer appears to result in more transient use of the Lake Michigan Campground. The location of Brevoort Lake Campground with its decreased traffic volume and the recreation opportunities it offers make it more of a destination facility.

Table 2

MONTHLY AVERAGE DAILY TRAFFIC

US-2 at Brevort (Four Miles West of Lake Michigan Campground)

<u>Month</u>	<u>Year</u>										<u>Average For All Years</u>
	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	
Jan	965	1085	1084	1080	1110	1089	1043	1001	1061	1067	1059
Feb	1124	1151	1175	1238	1210	1205	1081	1004	1195	1246	1163
Mar	1431	1305	1383	1733	1388	1270	1289	1138	1341	1356	1363
Apr	1523	1758	2141	1859	1903	1932	1803	1425	1851	1875	1757
May	2653	2734	2896	3145	2519	2545	2598	2603	2641	2725	2706
Jun	3773	3375	3721	3929	3520	3236	3385	3287	3559	3675	3546
Jul	5798	6081	6141	6170	4889	5629	5204	4756	5405	5550	5302
Aug	6173	6289	6246	6288	5329	5432	--	4631	5062	5200	5065
Sep	3371	4005	4175	4171	3552	3256	--	3406	3936	4025	3390
Oct	2747	2852	2780	3056	2583	2695	--	2574	2835	2900	2497
Nov	2546	2685	2775	2875	2535	2493	--	2327	2494	2550	2328
Dec	1539	1503	1480	1649	1507	1474	--	1437	1353	1400	1334
Annual A.D.T.	2637	2901	3000	3099	2894	2638	2342	2466	2561	2797	2734

Comparing Lake Michigan and Brevoort Lake campers to campers studied elsewhere (see Chapter II, Sections C and D) shows agreement with LePage's (1967, 1968) findings that older larger campgrounds (70 units or more) offering swimming and boating attract repeat customers who stay longer and plan to return.

Hendee's (1969) finding that management rules to protect the environment interfere with campers social goals will be evaluated in the 1985 response form survey (see Appendix A, Figures 1 and 2). He discussed how upgrading primitive campgrounds to modern facilities displaces the original clientele. To the extent that that is true it has already happened at Brevoort and Lake Michigan. The author (Beauvais) assumes that the converse is also true; downgrading facilities (removal of flush toilets) will result in displacement of the current users with a subsequent loss of revenue due to lowered fees and occupancy. Hendee's recommendation to locate highly developed campgrounds close to main highways applies to both Brevoort Lake and Lake Michigan Campgrounds.

Further similarities between campers elsewhere in the United States and those in the study area were difficult to deduce. The following studies (Cordell and Sykes, 1969; Cordell and James, 1972; Lime, 1971; Moeler, Larson, and Morrison, 1974); showed that campers studied favored:

- Reservation systems
- Nearby, clean comfort stations
- Hot showers

- Lake front sites
- Scenery
- Shade
- Campstores

Comments on fee envelopes from campers at Brevoort and Lake Michigan have echoed some of the same desires (see Appendix A). Forest Service policy, as summarized in chapter II, Section C, is aimed at:

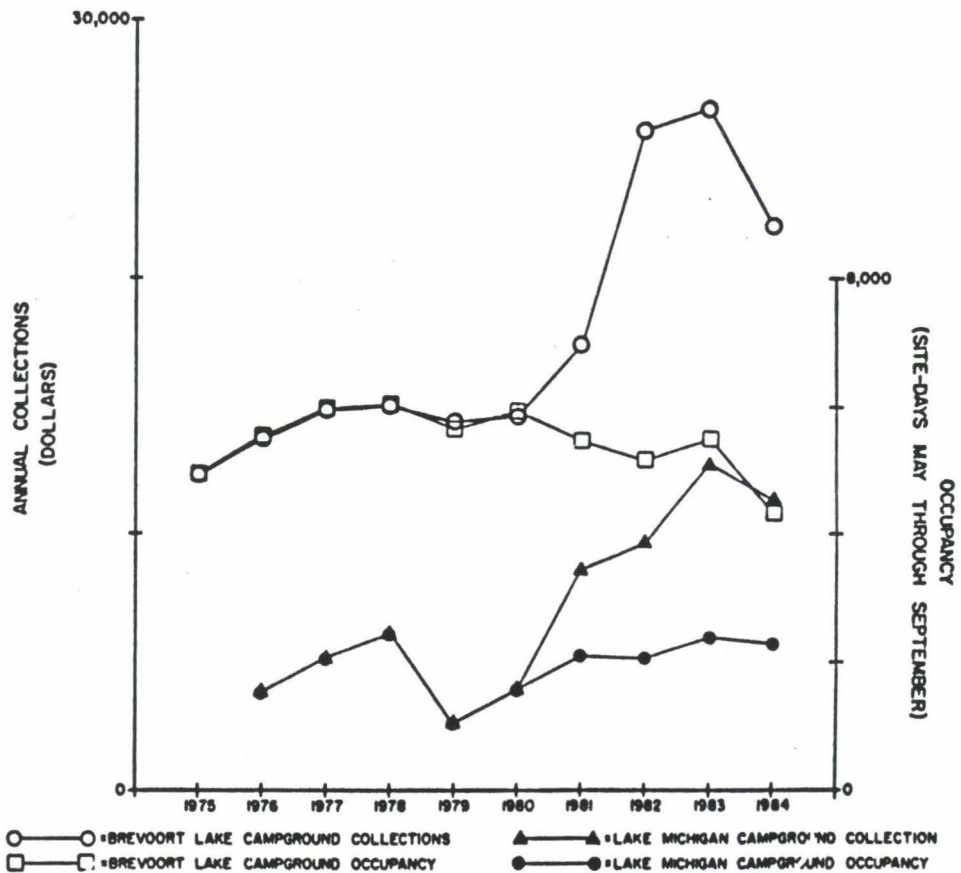
- Scaling back to development levels 1, 2 and 3
- Avoiding private sector competition
- Emphasizing quality experiences
- Promoting concessions

Lacking detailed information on the study area campground users made it difficult to determine whether their desires for recreation experiences conflict with agency policy. Completing a master plan for the area should answer questions on recreation experiences and management.

B. Brevoort Lake and Lake Michigan Campgrounds Use Data and Fee Collections

Data on fee collections and occupancy was compiled from 1975 - 1984 (see Figures 10 and 11). During 1975 - 1980 the camping fee was \$3 per day. Therefore, in Figure 10 the occupancy and collection lines are parallel because at a constant price they measure the same thing. Starting in 1981, however, it can be seen that occupancy changes very little while collections increase dramatically. As shown in the footnotes for Figure 10, the daily fee was raised starting in 1981.

Figure 10

CAMPGROUND COLLECTIONS AND OCCUPANCY

1) Daily Camping Fees

1975 - 1980 = \$3; 1981=\$4; 1983=\$5 L. Michigan - \$5 for 29 interior sites at Brevoort - \$6 for 41 lakeside sites at Brevoort

1983 - 1984 = \$5 for 17 sites without flush toilets at L. Michigan - \$6 all other sites

2) Fee box thefts recorded July, 1982 at Lake Michigan

3) Site Closures

1975 - Lake Michigan closed May 1 - Sept. 30 - Brevoort closed Sept. 1-30

1979 - 18 sites closed in Lake Michigan - May 1 - 31

1980 - 17 sites closed in Lake Michigan - May 1 - 31

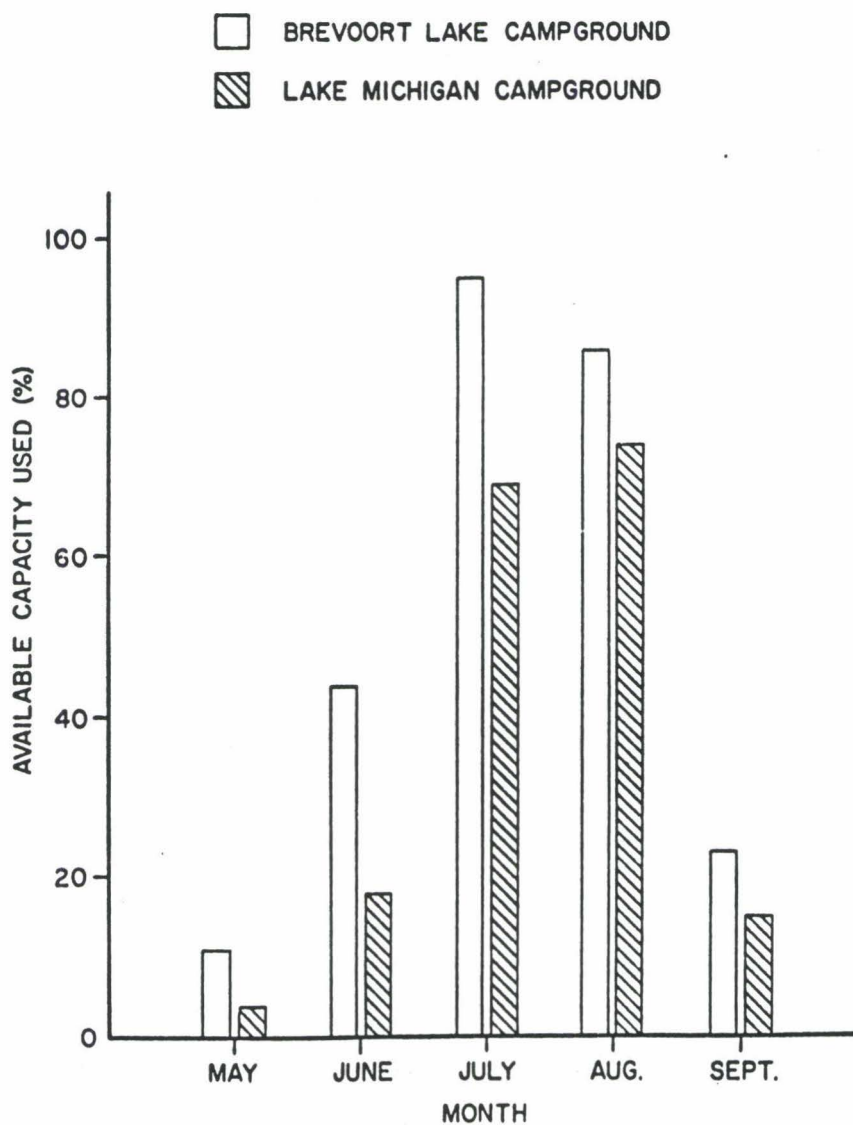
1984 - 18 sites closed in Lake Michigan - May 1 - July 2 - Brevoort closed May 1 - June 28

4) 35 sites in Lake Michigan Campground - 70 sites in Brevoort Campground

5) A site-day is one campsite occupied for one calendar day. If the site capacity is 5 people then one site-day = 5 persons at one time - days (PAOT-days)

Figure 11

PERCENT OF AVAILABLE CAPACITY USED
BREVOORT LAKE AND LAKE MICHIGAN CAMPGROUNDS
1975 — 1984 (MONTHLY AVERAGES)



Available capacity used is shown in Figure 11 as monthly averages for a ten-year period. During May and September campground loops are opened and closed depending on demand. The entire campground is not open, but all sites are considered available, because the sites have been readied and the water systems have been turned on. As few as 10 of 70 sites may be open in Brevoort Campground in early May. At Lake Michigan Campground the arrangement of gates allows opening about half the campground at a time (17 sites).

Two nearby MDNR State Forest Campgrounds offer a total of 32 sites on Little Brevoort Lake (located west of Brevoort Lake and flowing into it). At \$4 per night the combined revenue in 1984 was \$6,173. Memorial Day to Labor Day occupancy is estimated to be 50% (Reid, 1985). Facilities are at development level three with handpumps and vault toilets.

The outlook for increasing occupancy in the future is good for Brevoort Lake Campground due to the improving fishery. Walleye season opens on May 15th and continues through the summer, fall and winter to the end of February. Fishing is usually best in the spring, fall and through the early and late ice.

C. Benefit/Cost Analysis

As an early step in determining project feasibility finding out how much a proposal will cost and what can be expected in return is essential. Following the procedures outlined in chapter III the

INVEST III program was run for six projects. Copies of the computer printouts are in Appendix C.

1. Brevoort Lake South Shore Stabilization

This project has a high initial cost (\$450,000), a very long life (up to 100 years), and the potential to produce benefits in fishing and waterfowl hunting, as estimated by the Forest fisheries and wildlife biologists using Resources Planning Act (RPA) Values. Although not quantified, failure to stabilize the dunes, resulting in continued loss of land, sedimentation of the lake, and fishing, and hunting opportunities foregone also has a cost.

Benefit/cost (B/C) ratios ranged from 3.55 at a 10 percent interest rate and a 20-year project life up to 12.46 at 4% interest and a 100-year life. Net present worths were \$1,060,141 and \$5,283,561 respectively. The internal rates of return were about 28%. According to Forest Operations Research Analyst Ron Hannan (Hannan, 1985) the internal rate of return assumes annual reinvestment. Since this is a one-time, capital intensive undertaking the internal rate of return is not considered meaningful. Four percent interest represents the real rate of return over and above the inflation rate and is widely used by federal agencies (Hannan, 1985).

The benefits of stabilizing the south shore would not accrue directly to the U.S. Treasury. If more people purchased licenses and equipment as a result of the better hunting and fishing on the south shore there

would be a return to the state and federal governments through license fees and taxes on fuel and equipment. The Brevoort Lake Campground and lakeshore resorts could experience increased use as a result of improved recreational opportunities. As discussed in Chapter II economic benefits from recreation can be viewed from the standpoint of the consumer surplus or direct and indirect expenditure (willingness to pay, travel-cost) associated with engaging in an activity. Social and psychological benefits are real but difficult to quantify.

Although an investment of \$450,000 is a lot of money it should be recognized that Brevoort Lake is a valuable resource. A rough estimate of the market value of all the shoreline property is \$9.0 million.

2. Brevoort Lake Group Camping

Converting the existing swimming and picnic area to group camping has been recommended during the next decade in the internal review draft of the Forest Plan. Existing investments at the site include a paved road, vault toilets, and a hand pump. Conversion to group camping will allow the Forest to collect fees, while providing a service to large parties wishing to camp together. It has been observed by recreation field personnel that three or more adjacent sites have been taken by campers traveling in a group. The Brevoort Campground response form (see Appendix A, Figure 1) will be used to solicit campers' views on a group camping area.

Based on the cost and benefit assumptions used (see Appendix C) the B/C ratio at 4% is 1.47 with a net present worth of \$11,378 or an initial investment of \$14,050. The alternatives to conversion to group camping are:

- Continued use as a picnic area
- Temporary closure - install a gate
- Permanent closure - remove facilities

Group camping is economically feasible and makes use of existing capital improvements.

3. Lake Michigan RV Sites

An 80-car parking lot was constructed at one end of the campground about twenty years ago for day use swimming and picnicking. It receives very little use for that purpose. District recreation personnel find that RV's use the parking lot as an overflow when the campground is full or when all the campsites with large, level pullouts are occupied. There is electricity, pressurized water, and a sewer system in the campground. Three options were considered:

- Creating 10 RV sites with full hookups and charging \$9 per night
- Creating 10 RV sites with electrical hookups and charging \$7 per night
- Creating 10 RV sites with no hookups and charging \$6 per night

At 4% the B/C ratio for full hookups is 1.37 with a present net worth of \$25,670 on an initial investment of \$38,000. For electrical hookups only the B/C ratio is 1.67 and the net present worth is

\$30,127 on an initial investment of \$21,000. For sites with no hookups the B/C ratio is 1.71 and the net present worth is \$26,640 on an initial investment of \$17,000. The proposals all appear economically viable under the cost and benefit assumption used (see Appendix C).

4. Brevoort Campground Electrical Hookups

Electricity is used in the campground for pumping well water, operating the sewer system, and lighting the toilet buildings. Some campers have commented that they would like to have electrical outlets at the campsites. An economic evaluation of two options to run electricity to either 10 or 40 sites was done. For 10 sites the benefit/cost ratio at 4% was 1.90 with a net present worth of \$6,002 on an initial investment of \$4,000. For 40 sites the benefit cost ratio was 1.77 and the present net worth was \$17,606 on an initial investment of \$14,400. Appendix C contains copies of the printouts.

D. Criteria For National Recreation Areas

The question was raised during preparation of the student project prospectus in October 1984 as to whether the study area might not qualify as a National Recreation Area (NRA). A review of the Forest Service Manual Chapter 2370 of June 1971 showed three characteristics of NRA's:

- Outstanding combinations of outdoor recreation opportunities
- Aesthetic attractions
- Proximity to users

Congressional interest seems to be the primary reason an NRA is established. The Lake Michigan - Brevort Lake area may fit the rather loosely defined criteria for an NRA. Without Forest Service interest and a push from Congress an NRA will not come about.

E. Cross-Country Ski Trail Development

For several years the idea of a cross-country ski trail on the St. Ignace Ranger District has been discussed. During 1984 the author proposed a ski trail within the study area (see Appendix H, Figure 1, Sections 15, 22, 23). Since that time Kurt Long Voelkner, a Forest Service seasonal engineering technician, volunteered to pursue the project by doing an environmental analysis, design, and on-the-ground layout. During this time a non-profit cross-country ski club was formed to coordinate and develop skiing opportunities in the St. Ignace Area. The author serves on the steering committee along with a representative of the Mackinac County Economic Development Commission, a city council member and the editor of the local newspaper.

The internal review draft of the Forest Plan calls for 10 miles of ski trail to be constructed in the next three years. With the active interest of the ski club and their efforts to put together a youth crew it appears 8 miles of trail can be constructed this summer. The Forest will assume the cost of purchasing the standard commercial trail signs. Other signs will be locally produced. Trail grooming will be the responsibility of the ski club. The proposed trail will provide skiing opportunities for local residents as well as attract a few people to visit the area in winter. According to a local innkeeper, skiers are coming to the area now but are on their way to a

place which has ski trails. The Mackinac County Economic Development Commission (see Appendix E) is actively promoting ski trail development. The only large expanse of hilly terrain with good access is the sand dune area managed by the Forest Service. With local support ski trail development is inexpensive and provides a nonmotorized winter recreation experience with potential for some economic benefit to the local economy.

F. Public Access to Brevoort Lake

The Forest has recognized for several years that Brevoort Lake has poor public access. The best boat ramp on the 4200 acre lake is located in the Brevoort Lake Campground. The resorts on the lake are small with limited facilities (no paved ramps). One access point is within a county road right-of-way but offers only roadside parking. No state facility or private marina is in operation.

The St. Ignace Ranger District proposed a new boat launch at a cost of \$27,000 in 1983. It was not selected for funding. In early 1985 the author made contact with the Waterways Division of the MDNR regarding their role in providing access to Brevoort Lake. They have shown interest in either developing an access site on federal land or acquiring private land. Who should operate and maintain a new access site has not been decided.

A petition by a lakeshore resident to the MDNR and U.S. Fish and Wildlife Service is currently circulating asking them to build a boat launch at the Brevoort Reef causeway, located on National Forest System Land. At the February 1985 Straits Area Sportsmen's Club

meeting the author discussed public access sites and who should build one. Locations will be evaluated by the MDNR and the Forest Service during 1985.

G. Concessions

Both Brevoort Lake and Lake Michigan campgrounds could likely become successful concessions. The master plan prospectus (Appendix F) and the five-year action plan (Appendix G) both call for an evaluation of this option.

Chapter 5

CHAPTER V

SUMMARY AND CONCLUSIONS

The problem studied was how to manage the land and resources of the Lake Michigan - Brevoort Lake area to provide a compatible mix of recreation opportunities for people to experience. The student project prospectus of October, 1984 set specific objectives, principal of which were the preparation of a master plan prospectus and 5-year action plan for the ranger district (see Appendices F and G). Each of the nine objectives in the student project prospectus is addressed in turn in the "conclusions" section of this chapter. due to the nature of this report, most of the conclusions and recommendations are also contained in the master plan prospectus (Appendix F) and the five-year action plan for the St. Ignace District (Appendix G).

A. Summary of Procedures and Findings

Procedures included a literature review of nearly sixty publications. It served to broaden the understanding of the author and to provide discussion material for Chapter IV.

The informal, four day survey of Brevoort Lake and Lake Michigan campground users provided a base to develop the post-project response form survey for the summer of 1985. The generalized user profile from

the informal survey was compared and contrasted with findings from other studies. Use data on the campgrounds showed current and historic occupancy, use, and collections.

The MDNR creel census is ongoing. Procedures are theirs. Findings will be shared with the Forest Service to conduct an economic analysis of fisheries benefits.

Benefit/Cost (B/C) analysis was used to assess feasibility of proposals. At a four percent real rate of return all of the proposals evaluated had a favorable B/C ratio.

B. Conclusions

Conclusions are limited by the scope of the study, and broadly based upon the findings. Each of the nine student project prospectus objectives is paraphrased and a conclusion stated.

- Clarify roles of other agencies, cooperators, and the private sector

The MDNR Waterways Division is actively pursuing funding and construction of a boat launch for Brevoort Lake.

The MDNR Fisheries Division is conducting a creel census on Brevoort Lake.

The MDNR Fisheries Division is cooperating in Brevoort reef monitoring. They will stock walleye if needed.

The Silver Mountain Cross-Country Ski Club has a Michigan Summer Youth Employment Training crew to help construct 8 miles of ski trail laid out by a Forest Service volunteer.

Ski trail construction has been funded from an insurance company grant.

Ski trail and tourism development is being promoted by the Mackinac County Economic Development Commission.

- Master Plan Prospectus

See Appendix F.

- Does the study area meet National Recreation Area Criteria?

Criteria are not rigidly defined. Designation is politically initiated.

- Brevoort Lake Public Access

MDNR Waterways Division is actively pursuing funding to construct a boat launch.

- Camping Demand and Development Levels

A formal camping demand study is recommended in the master plan prospectus.

A capital investment project to reconstruct the wastewater treatment systems at Brevoort Lake and Lake Michigan Campgrounds is anticipated for fiscal year 1987.

Capital investment proposals to add 10 RV sites at Lake Michigan Campground, group camping at Brevoort Lake, and electric hookups at 10 sites in Brevoort Lake Campground will all receive further evaluation in the master planning process.

Decisions to depart from current campground facility development levels will be made in the master plan.

- Benefit/Cost Analysis for Stabilization and Habitat Improvement of the South Shore of Brevoort Lake

Favorable B/C ratio and net present worth at four percent real rate of return. See Chapter IV, Section C-1 and Appendix C.

- Cross-Country Ski Trail

Environmental analysis drafted.

Location layed out on the ground.

Anticipated volunteer/grant construction summer 1985. See Chapter IV, Section E.

- Post-Project Camper Response Form Survey

Revised draft version has been submitted for Regional Office approval. See Chapter II, Sections A, B and C and Appendix A Figures 1 and 2.

- Five-Year Action Plan for St. Ignace District

See Appendix G.

C. Discussion and Implications

There is a lack of direct knowledge about the recreation users of the Forest by recreation managers at all levels. The timber resource is inventoried with a high degree of precision and accuracy. The recreation user - the producer of all the thousand of Recreation Visitor Days (RVD's) on the Forest - is a virtual unknown entity. As repeatedly pointed out in the literature, resource managers are not necessarily equipped to understand and manage people. Understanding of the social sciences is needed. The professional development in Outdoor Recreation Management Short Courses are meeting that need. Site-specific evaluations of users is needed to effectively practice the teachings learned in the short courses.

Policies need to be implementable and consistent. The two policies of scaling down the development level of fee areas to reduce O&M costs while pushing for greater fee collections can be reconciled, but only with great difficulty. Charges cannot be levied for something not offered. On the other hand increased charges will not necessarily recover higher costs of providing additional services. A case by case evaluation of facility development levels, based on cost of provision studies (Reiling, Anderson, and Gibbs, 1983), benefit/cost analysis, user preferences and willingness to pay, and professional recreation management principles is needed.

Resources and experiences not bought and sold in the marketplace may be given short shrift when compared to market commodities producing returns to the Treasury. Accepted methods to estimate the value of non-market resources exist. Resources Planning Act (RPA) Values are useful, but emphasis should be placed on developing locally verified values and using them. Just as timber values are determined locally so should recreational values. A more meaningful comparison of relative values would be possible.

Despite the best efforts of researchers some values will remain intangible. This should not be cause for concern, for it reflects the human and spiritual element of resources and experiences - the comfort an urban resident derives from knowing a bald eagle exists in the wild; the upbeat mood a hiker or hunter takes home from the woods; or the release of frustration and energy from participating in a whitewater challenge. An element of mystery is desirable in recreation management, but it shouldn't be between the user and manager.

D. Recommendations

The principal recommendations are:

- Adhere to the five-year action plan for the Lake Michigan - Brevoort Lake Recreation Management Area (see Appendix G). Amend and update it annually as items are incorporated into the Forest Program of Work or selected for capital investment.
- Prepare and implement a master plan for the Lake Michigan - Brevoort Lake Recreation Management Area following the prospectus (see Appendix F).

Within the foregoing documents are numerous specific recommendations.

General recommendations are:

- Where forest land and resource management planning does not provide the necessary specificity to manage an area, develop a special management or master plan tiered to the Forest Plan.
- Shift toward managing recreation experiences rather than just facilities. Conduct necessary inventories (ROS based) and studies to understand experiences currently being sought, as well as potential opportunities.
- Continue integrating economics into management and decision making. Make use of skills acquired for forest planning and FORPLAN development to conduct site specific economic and resource valuation studies. Use these in master, special management, or project planning and environmental analysis.
- Incorporate recreation users in public involvement efforts through the response form method used by the Allegheny National Forest and modified by the author.
- Continue development of professional recreation management skills in the Forest Service. Training is important, but management support to incorporate appropriate methods of recreation research and management are needed to better capitalize on the training.

Bibliography

BIBLIOGRAPHY

- Argow, Keith A., and Fedkiw, John. 1963. Recreation user fee income: How far does it go toward meeting costs? J. Forest. 61(10): 751 - 753, illus. (U.S.D.A.)
- Arthur, Louise M. 1978. Attitude toward wildlife management: a study of hunters and fishermen in the U.S. U.S. Fish and Wildlife Rep., in progress.
- Beardsley, Wendell G. 1971. The economic impact of recreation development: A synopsis. In Recreation Symp. Proc., Syracuse, N.Y., Oct. 12-14, 1971: 28-32. USDA Forest Serv., Intermountain Forest and Range Exp. Sta., Ogden, Utah. (INT)
- Blank, Uel, Stipe Jr. Sterling H. 1971. Economic impact of the Crow Wing Canoe Trail, Wadena County, Minn. USDA Econ Res Ser ERS 467 29p
- Bryan, H. 1984. Presentation at Clemson U. Rec. Mgmt. Short Course.
- Bury, Richard L. 1964. Information on campground use and visitor characteristics. USDA Forest Serv. Res. Note PSW-43, 3pp. (PSW)
- Clark, R.N., Hendee, J.C. and Campbell F.L. 1971. Values, Behavior, and Conflict in Modern Camping Culture. Journal of Leisure Research. Vol. 3, Number 3.
- Convery, F.J. 1976. Economics applied to outdoor recreation: an evaluation. USDA For Serv Gen Tech Rep SE U S Southeast For Exp Stn.
- Cordell, Harold K., and James, George A. 1972. visitors preferences for certain physical characteristics of developed campsites. USDA Forest Serv. Res. Pap. SE - 100, 21 p., illus. Southeastern Forest Exp. Sta., Asheville, N.C.. (SE)
- Cordell, Harold K., and Sykes, Clinton K. 1969. User preferences for developed-site camping. U.S.D.A. Forest Serv. Southeast. Forest Exp. Sta., Asheville, N.C. Res. Note SE - 122, 6 pp., illus. (SE)
- Driver, Beverly L. 1974. Quantification of outdoor recreationists' preferences. Research: camping and environmental education. The Penn. State Univ., University Park, Pa., Betty Van de Smissen and J. Myers, Editors. HPER No. 11. 166-188 (RM)
- Driver, B.L. Date of Pub. Unknown. Toward a better understanding of the social benefits of outdoor recreation participation. Rocky Mtn. for. and Rge. Exp. Sta. Handout from R. Schreyer at Clemson U. Rec. Mgmt. Short Course.

- Driver, B.L., Brown, P.J. 1975. a social-psychological definition of recreation demand, with implications for recreation resource planning. In *Assessing Demand for Outdoor Recreation* P. 63-88. Ref. GV 191.4N3
- Driver, B.L. and R.C. Knoph. 1976. Temporary escape: one product of sport fisheries management. *fisheries*, (1)2: 21-29. (RM)
- Echelberger, H.E., Gilroy, D. and Moeller, G. 1983. Recreation Research Publications. Bibliography 1961 - 1982. USDA - Forest Service. Washington, D.C.
- Feuchter, R. 1984. Presentation at Clemson U. Rec. Mgmt. Short Course.
- Feuchter, R. 1984. Speech at Colorado State U. Natural Resource Days.
- Hammitt, William E., McDonald, Gary D. 1982. Response bias and the need for extensive mail questionnaire follow-ups among selected recreation samples. *Res. Note. J. Leisure Res.* 14(3): 207-216; (SE)
- Hannan, R. 1985. Personal Communication.
- Hendee, J.C. and F.L. Campbell. 1969. social aspects of outdoor recreation-the developed campgrounds. *TRENDS in Parks and Recreation*, Oct. p. 13-16. Natl. Recreat. and Park Assoc.
- James, George A., Wingle, Peter H. and Griggs, James D. 1971. Estimating recreation use on large bodies of water. USDA Forest Serv. Res. Pap. SE - 79, 7 p., illus. Southeastern Forest Exp. Sta., Asheville, N.C. (SE)
- Joy, R. 1984. Eastern Region - Fall management team meeting background paper.
- LaPage, Wilbur F. 1967. Camper characteristics differ at public and commercial campgrounds in New England. USDA Forest Serv. Northeast. Forest Exp. Sta., Broomall, Pa., Res. Note NE-59, 8 pp., illus. (NE)
- LaPage, Wilbur F. 1967. Successful private campgrounds, a study of factors that influence the length and frequency of camper visits. USDA Forest Serv. Northeast. Forest Exp. Sta., Upper Darby, Pa., Res. Pap. NE-58, 22 pp., illus. (NE)
- LaPage, Wilbur F. 1968. The role of customer satisfaction in managing commercial campgrounds. USDA For. Serv. Res. Pap. NE-105, 23 pp., illus. (NE)
- Lewis, Gordon D. 1975. The benefits of vacation home developments to county governments. In *Man, Leisure, and Wildlands: A complex interaction*. Proc. First Eisenhower Consortium Res. symp., Eisenhower Consortium Bulletin No. 1, 114-120. (RM)

- Lime, David W. 1971. Factors influencing campground use in the Superior National Forest of Minnesota. USDA Forest Serv. Res. Pap. NC - 60, 18 pp., illus. North Central Forst Exp. Sta., St. Paul, Minn.
- Lime, David W. 1972. Behavioral research in outdoor recreation management: An example of how visitors select campgrounds. 198-206. In Environment and the Social Sciences: Perspectives and Applications. Ed. by J.F. Wohlwill and D.H. Carson, Amer. Psychol. Ass. (NC)
- Lucas, Robert C. 1965. The importance of fishing as an attraction and activity in the Quetico-Superior Area. USDA forest Serv. Res. Note LS-61.
- Magill, Arthur w. 1976. Campsite reservation systems...the camper's viewpoint. USDA, For. Serv. res. Pap., PSW-123, 15 p. (PSW)
- Mapp Jr. Harry P; Badger, Daniel D. 1970. Input-output analysis of the economic impact of outdoor recreation in a low income area. West Agr. Econ. Ass. Proc. 118-121.
- McConnel, J. 1984. Presentation at Clemson U. Rec. Mgmt. Short Course.
- Moeller, George H. and Engelken, John. 1972. What fishermen look for in a fishing experience. J. Wildlife Manage. 36(4): 1253-1257. (NE)
- Moeller, George H., Larson, Rodney G., and Morrison, douglas A. 1974. Opinions of campers and boaters at the Allegheny Reservoir. USDA For. Serv. Res. Pap., NE-307. 1-26, illus. (NE)
- Moeller, G, Mescher, M. and Shafer, E. 1980. The information interview as a technique for recreation research. J. of Leisure Res., 12(2): 174 - 182. (NE)
- O'Leary, J.T. 1984. Future concerns for visitor management. Presented at Purdue U. cont. Ed. for Nat. Res. Managers.
- Olson, G.R. 1976. a critique of the entitled "Economics applied to outdoor recreation: an evaluation: Southeastern Forest Experiment Station. USDA For. Serv. Gen. Tech. Rep. SE. U.S. 120 - 121.
- Osborn, Howard A. 1976. Spruce Know-Seneca rocks National Recreation Area; Impact on the local community. Economic Research Service, U.S. Dept. of AG., Washington. 61 p. 1751.A413 No. 3.
- Palm, R.C. Jr. Malvestuto, S.P. 1983. Relationships between economic benefit and sport-fishing effort on West Point Reservoir, Alabama-Georgia Transactions of the American Fisheries Society. V. 112 (1), P. 71-78.

- Potter, Dale R., Sharpe, Kathryn M. and Hendee, John C., Clark, Roger N. 1972. Questionnaires for research: An annotated bibliography on design, construction and use. USDA Forest Serv. Res. Pap. PEW-140. 80 p. (PNW)
- Peterson, R.M. 1984. Address to American Recreation Coalition.
- Reid, D. 1985. Personal communication.
- Reiling, S.D., Anderson, M.W., Gibbs, K.C. 1983. Measuring the Costs of Publicly Supplied Outdoor Recreation Facilities: A Methodological Note. Journal of Leisure Research v. 15 (3), Third quarter. p. 203-218.
- Reiling, S.D., Cook, C.M. and Taylor, J.L. 1982. Economic impact of ice fishing in Maine, Orono, Me., Bulletin - Maine, Life Sciences and Agriculture Experiment Station. (783) 27 p.
- Schreyer, R. 1980. Survey Research in Recreation Management - Pitfalls and Potentials. Journal of Forestry. Handout at Clemson U. Rec. Mgmt. Short Course.
- Schreyer, R. 1984. Presentation at Clemson U. Rec. Mgmt. Short Course
- Shafer, E.L., Moeller, G. Date of Publication Unknown. Be careful with public opinion surveys. Handout at Clemson U. Rec. Mgmt. Short Course.
- Shilling, J. 1984. Presentation at Clemson U. Rec. Mgmt. Short Course.
- Tobin, R.B. 1983. Recreation planning in the White Mountains National Recreation Area: The recreation-opportunity-spectrum system. Agroborealis - Alaska Agricultural Experiment Station, Fairbanks. P. 18-23.
- USDA - Forest Service, Southern Region. 1980. Final Management Plan and EIS, Mt. Rogers N.R.A.
- USDA - Forest Service Washington Office, 2300 Memo of 6/28/84.
- USDA - Forest Service. 1977. Final EIS and Management Plan for Flaming Gorge NRA.
- USDA - Forest Service, Southern Region. 1979. Draft EIS and Management Plan for Mt. Magazine Recreation Development Level.
- USDI - National Park Service. 1976. Final EIS and Master Plan for the St. Croix National Scenic Riverway.
- USDI - National Park Service. 1980. Final EIS and Master Plan for Voyageur National Park.

Wellman, J.D., Dawson, M.S., Roggenbuck, J.W. 1982. Park managers' predictions of the motivations of visitors to two National Park Service areas. J. Leis, Res., First Quarter 1982: 1-15. (RM)

Wennergren, E.B., Johnston, W.E. 1977. Economic concepts relevant to the study of outdoor recreation. USDA For. Serv. Gen. Tech. Rep. WO 2: 3-10.

Appendix A

Appendix A

Figure 1

BREVOORT LAKE CAMPGROUND RESPONSE FORM

DRAFT

NUMBER: _____

DATE: _____

The United States Department of Agriculture's Forest Service campground management goal is to make your stay safe and enjoyable. We welcome your comments to better manage the campground and lake. Please include any comments in the spaces provided; if you need additional space, use the back of this form.

STATEMENT - Maintaining a clean campground and keeping facilities in good repair are important to the Forest Service. Your comments on the cleanliness and condition of the facilities would be greatly appreciated.

RESPONSE _____

STATEMENT - A lot of campers are looking for recreation opportunities in the campground, lake, and surrounding area. Your comments on this subject would be appreciated.

RESPONSE _____

STATEMENT - We stress camper safety and security. Rules and regulations along with patrols by the County Sheriff and the Forest Service are intended to keep the campground a safe and pleasant place to stay. Your comments on rules, their enforcement, and campground safety would be helpful to us.

RESPONSE _____

STATEMENT - The Brevoort Reef, 2100 feet of rock for walleye spawning and to produce food and cover for fish, is scheduled for completion this summer. Your comments on this effort would be appreciated.

RESPONSE _____

STATEMENT - Many campers travel together and use two or more adjacent campsites. The picnic area down the road could be converted into two large campsites for groups of up to 20 people. Reservations could be made for a non-refundable fee. Your comments on group camping would be appreciated.

RESPONSE _____

STATEMENT - Electrical hookups are available in some campgrounds. Electricity could be run to the first ten sites with an additional charge for that service. Your comments would be helpful in evaluating this idea.

RESPONSE _____

ADDITIONAL COMMENTS -

UNDER THE FREEDOM OF INFORMATION ACT (FOIA) YOUR NAME, ADDRESS, AND COMMENTS COULD BE RELEASED AS PART OF THE PUBLIC RECORD IF A LEGITIMATE FOIA REQUEST IS MADE. YOUR PRIVACY IS PROTECTED FROM COMMERCIAL OR POLITICAL REQUESTS. YOU WILL BE NOTIFIED IF THIS FORM IS PROVIDED TO ANYONE MAKING A LEGITIMATE FOIA REQUEST.

If you want a written response to any of your comments, please provide your name and address; otherwise leave this blank.

Name

Street

City

State

Zip

Thank you for your comments. Please fold and place this form in the response form collection box near the fee depository.

District Ranger

Figure 2

LAKE MICHIGAN CAMPGROUND RESPONSE FORM

DRAFT

NUMBER: _____

DATE: _____

The United States Department of Agriculture's Forest Service campground management goal is to make your stay safe and enjoyable. We welcome your comments to better meet your needs. Please provide any comments in the spaces provided; if you need additional space, please use the back of this form.

STATEMENT - Maintaining a clean campground and keeping facilities in good repair are important to the Forest Service. Your comments on the cleanliness and condition of the facilities would be greatly appreciated.

RESPONSE _____

STATEMENT - A lot of campers are looking for recreation opportunities in the campground, lake, and surrounding area. Other people are just passing through. Your comments on the things you enjoy doing would be helpful.

RESPONSE _____

STATEMENT - We stress camper safety and security. Rules and regulations along with patrols by the County Sheriff and the Forest Service are intended to keep the campground a safe and pleasant place to stay. Your comments on rules, their enforcement, and campground safety would be helpful to us.

RESPONSE _____

STATEMENT - The large paved parking lot at the west end of the campground was built for picnickers and swimmers. Ten campsites for recreational vehicles could be put in that parking area. Your thoughts on this idea would be appreciated.

RESPONSE _____

ADDITIONAL COMMENTS -

UNDER THE FREEDOM OF INFORMATION ACT (FOIA) YOUR NAME, ADDRESS, AND COMMENTS COULD BE RELEASED AS PART OF THE PUBLIC RECORD IF A LEGITIMATE FOIA REQUEST IS MADE. YOUR PRIVACY IS PROTECTED FROM COMMERCIAL OR POLITICAL REQUESTS. YOU WILL BE NOTIFIED IF THIS FORM IS PROVIDED TO ANYONE MAKING A LEGITIMATE FOIA REQUEST.

If you want a written response to any of your comments, please provide your name and address; otherwise leave this blank.

Name

Street

City

State

Zip

Thank you for your comments. Please fold and place this form in the response form collection box near the fee depository.

District Ranger



CAMPGROUND SERVICE
RESPONSE FORM

CAMPGROUND

DATE

The Forest Service's campground management goal is to make your stay safe and enjoyable. We would appreciate your comments on how well we have met our objective. Please write your comments in the spaces provided. Make additional comments on the back of this form if you need more space.

OBJECTIVE - The first impression of our campground should make you feel welcome in a pleasing forest environment.

COMMENT _____

OBJECTIVE - The camp units and facilities were clean, in good condition, and adequate to meet your needs.

COMMENT _____

OBJECTIVE - The campground and surroundings provided recreation opportunities for the entire family.

COMMENT _____

OBJECTIVE - Recreation fees were fair and comparable with fees charged for similar services in the area.

COMMENT _____

OBJECTIVE - Forest Service employees were friendly, helpful and fair in carrying out their administrative responsibilities.

COMMENT _____

OBJECTIVE - Maps, general information, rules and regulations were readily available and easily understood.

COMMENT _____

OBJECTIVE - You felt safe and secure in our campgrounds knowing that rules and regulations would be promptly and fairly enforced.

COMMENT _____

ADDITIONAL COMMENTS

If you want a response to any of your comments, please give us your name and address.

Name

Street

City

State

Zip

Thank you for your comments. Please fold and place this form in the fee depository when you leave.

DISTRICT RANGER

USDA—Forest Service



**BREVORT LAKE
DAILY FEE \$6.00**

**TO VALIDATE COMPLETE
THE FOLLOWING**

(Make checks payable to USDA—Forest Service)

1. Amount Enclosed	2. No. of Days Paid	3. Date Permit Purchased Mo. Day Yr. (23-28)
4. Car License	5. State	6. Selected Camp Unit No. (29-34)
7. Golden Age or Golden Access Passport No. (if applicable)		

Complete This Block ONLY ONCE During Your Stay			
1. First Day Arrival Time Nearest Hr. AM/PM (8-9) (10)		2. No. People in Party (11-12)	
3. Home Zip Code (First 5 digits) (13-17)		4. Expected Departure Date Mo. Day Nearest Hr. AM/PM (18-19) (20-21) (22)	

B 0276517

FS-2300-26b (2/82)

☆ GPO : 1982 O-359-827

PERMIT

B 0276517

Valid only at the site for the
Day(s) Paid Beginning

Date Permit Purchased		
Mo.	Day	Year

Number of Day(s) Paid



**Campers Note: Check out 2:00 PM
DETACH THIS STUB AND DISPLAY ON
VEHICLE DASHBOARD CLEARLY
VISIBLE FROM OUTSIDE.**

CAMPERS COMMENTS *(Suggestions to improve
public service in the National Forests)*

Figure 4

BREVOORT LAKE CAMPGROUND

10 YEAR USE RECORD BY MONTH (1975-1984)

<u>Month</u>	<u>Site-Days Available</u> ^{1/}	<u>Site-Days Used</u>	<u>Percent of Available Capacity Used</u>
May	2170	241 ^{2/}	11%
June	2100	925 ^{2/}	44%
July	2170	2061	95%
Aug	2170	1869	86%
Sep	2100	517 ^{3/}	25%

1/ A site-day is one campsite available for one calendar day. Example:
70 sites in Brevoort Lake Campground multiplied by 31 (or 30) days =
2170 or 2100 site-days.

2/ Closed 1984

3/ Closed 1975

LAKE MICHIGAN CAMPGROUND

10 YEAR USE RECORD BY MONTH (1975-1984)

<u>Month</u>	<u>Site-Days Available</u>	<u>Site-Days Used</u>	<u>Percent of Available Capacity Used</u>
May	1085	48 ^{1/}	4%
June	1050	194 ^{2/}	18%
July	1085	751 ^{2/}	69%
Aug	1085	799 ^{1/}	74%
Sep	1050	158 ^{1/}	15%

1/ Closed 1975

2/ Closed 1975 - Partially closed 1984

BREVOORT LAKE CAMPGROUND OCCUPANCY BY MONTH AND YEAR

<u>YEAR</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>Sept</u>	<u>Total Occupancy (Site-Days)</u>	<u>Funds Collected (Dollars)</u>
1975	230	797	2124	1781	Closed	4932	\$12,330
1976	149	859	2086	1961	449	5504	\$13,760
1977	324	1191	2081	1846	517	5959	\$14,898
1978	293	1178	2150	1927	499	6047	\$15,118
1979	244	957	2130	1782	581	5694	\$14,406
1980	282	950	2140	2093	430	5895	\$14,620
1981	233	965	1993	1846	431	5468	\$17,484
1982	202	716	2050	1718	500	5186	\$25,720
1983	212	709	1969	1837	738	5465	\$26,537
1984 ^{2/}	Closed	Closed	1888	1897	512	4297	\$22,038

PRESENT OCCUPANCY	11%	44%	95%	86%	25%
			<hr/>		
			90.5%		
		<hr/>			
		75%			
		<hr/>			
		62.5%			
		<hr/>			
		52%			
		<hr/>			

1/ FEES 1975 thru 1980 - \$3.00
1981 - \$4.00
1982 Diff. pricing - \$5.00 Interior Sites - \$6.00 lakeside sites.
1983 & 1984 - \$6.00 all sites

2/ Closed May and June due to water system reconstruction.

LAKE MICHIGAN CAMPGROUND OCCUPANCY BY MONTH AND YEAR

<u>YEAR</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>Sept</u>	<u>Total Occupancy (Site-Days)</u>	<u>Funds Collected (Dollars)</u>	<u>1</u>
1975	Closed	Closed	Closed	Closed	Closed	-0-	-0-	
1976	8	56	582	789	94	1529	\$3,823	
1977	68	219	872	758	132	2049	\$5,123	
1978	62	241	969	991	165	2428	\$6,070	
1979	25 <u>2/</u>	125	427	413	54	1044	\$2,641	
1980	59 <u>3/</u>	257	520	607	160	1603	\$3,975	
1981	47	261	859	808	165	2140	\$8,553	
1982	41	156	859 <u>4/</u>	823	202	2081	\$9,639	
1983	47	207	934	966	241	2348	\$12,738	
1984	77 <u>5/</u>	220 <u>5/</u>	741 <u>6/</u>	1038	212	2288	\$11,341	
PRESENT OCCUPANCY	4%	18%	69%	74%	15%			
			<hr/> 72%					
			<hr/> 54%					
			<hr/> 44%					
			<hr/> 36%					

1/ FEES 1975 thru 1980 - \$3.00

1981 - \$4.00

1982 - \$5.00

1983 thru 1984 - \$5.00 - \$6.00 - 18 sites \$6.00 - 17 sites \$5.00

2/ 18 sites closed for site rehab.

3/ 17 sites closed for site rehab.

4/ Fee box thefts recorded during month.

5/ 18 sites closed for repair of water system

6/ 18 sites closed for 2 days

BREVOORT LAKE CAMPGROUND VISITOR SURVEY SUMMARY:

1981

Total Number Interviews		85
Repeat Customers	62 -	73%
Number Power Boats	51 -	60%
Number Sail Boats	16 -	19%
Number Motor Bikes	9 -	11%
Number Regular Bicycles	26 -	31%
Number With Pets	26 -	31%
Number Camper Trailers With Cars	20 -	24%
Number Camper - Truck Trailers	34 -	39%
Number Tent Campers	33 -	39%
Number Motor Homes	8 -	9%

Some Sites had both Trailer and Tent Campers

Total Number of Persons	322
Average Number of Persons Per Site	3.78
Percentage of People Wanting Electricity to Sites	19%

UNIT #	NO. PERSONS	TYPE OF VEHICLE	PETS	BIKES		BOATS		REPEATS	COMMENTS
				REG.	MOTOR	ROW, SAIL	POWER		
1	3	Car, Camper	1	-	-	-	1	Yes	Motor Bikes going Through Campground.
2									
3	6	Car, Camper	1	-	-	-	1	Yes	Been Great.
4	4	Tent Camper Car	-	-	-	-	1	Yes	Dog crap everywhere. The jets fly too low
5	2	Tent Camper Car	-	-	-	-	-	Yes	Jets fly too low, No Personnel to talk to
6	2	Truck, Tent	-	-	-	-	1	Yes	Very Nice.
7	4	Truck, Trailer	-	11	-	-	1	Yes	More Campsites.
8	2	Tent Camper Truck	-	-	-	-	1	No	Very Nice.
9	4	Tent and Camper, Car & Truck	-	1	-	-	1	Yes	Stop the Jets.
10	4	Car, Truck Tent Camper	-	-	1	1	-	Yes	Electricity to sight Price too high witho
11	3	Trailer & Truck	-	-	1	1	-	Yes	Electricity to sight Price too high witho
12									
13	3	Cars, Tent Camper	1	1	1	-	1	Yes	Very Good.
14	2	5th Wheel Camper, Truck	1	-	1	-	-	Yes	Bad stump should be removed.
15									
16	3	Tent Camper Car	-	-	-	-	1	Yes	Should have showers. Electric plugs.
17	2	Trailer, Car	-	-	-	-	2	Yes	
18	2	Truck, Tent	-	1	1	-	-	Yes	
19	2	Tent Camper Car	-	-	-	-	1	Yes	Like it very much.

A-13

[illegible]

[illegible]

UNIT #	NO. PERSONS	TYPE OF OF VEHICLE	PETS	BIKES		BOATS		REPEATS	COMMENTS
				REG.	MOTOR	ROW, SAIL	POWER		
1									
2	4	Tenting Van	-	2	-		1	Yes	Cars going too fast. Everything nice and clean. Ranger nice.
3	4	Tent Camper	1	-	-	1	-	Yes	Skunks.
4									
5	5	Two Tents	-	3	-		1	Yes	
6	2	Motor Home	2	-	-		1	Yes	Boat Ramp.
7	6	Pick up Camper Tent	-	-	-			Yes	Everything is nice.
8	5	Pick-Up	2 Dog	3	-	-	-	No	
9	4	Motor Home	-	-	-	-	1	Yes	
10	7	Car, Tent Camper, Tent	2					No	
11	5	Tent Camper and Tent	4	-		2	1	Yes	More Garbage Cans. Don't put in Electri
12									
13	4	Camper	1	-	-		1	Yes	Too much money. Cle up Lady is very good job.
14	2	Trailer	-	-	-	-	-	Yes	
15	2	Tent, Car	-	-	-		1	Yes	Showers and toilets are kept clean.
16	2	Trailer	-	2	-		1	Yes	Skunks
17	2	Tent Camper	-	-	-	-	-	Yes	Just fine.
18									
19									
20	4	5th Wheel	-	1	-	1	-	No	Electricity - More water out lets.
21									
22	4	Tent, Truck	-	-	-	1	-	Yes	Skunks are bad.

BREVOORT LAKE AUGUST 5TH 1981

A-16

[illegible]

[illegible]

BREVOORT LAKE CAMPGROUND ROAD COUNTERS

1982

Campground Road: START JUNE 24
(FR 3473) END Nov 8

TOTAL DAYS IN USE: 111 DAYS

TOTAL VEHICLES: 44,177

TOTAL AVERAGE PER DAY: 397.99

Trailer Waste Station:

TOTAL DAYS IN USE: 54 DAYS

AVERAGE PER DAY: 37.53

BREVORT LAKE CAMPGROUND VISITOR SURVEY SUMMARY 1982SURVEY TAKEN ON 6-30-82

TOTAL NUMBER INTERVIEWS	24
TOTAL NUMBER PERSONS	109
AVERAGE NUMBER PER SITE	4.54
REPEAT CUSTOMERS	18 = 75%
AVERAGE YEARS OF REPEATED	8.83 YEARS
AVERAGE LENGTH OF STAY	7.54
NUMBER OF SITES WITH TENTS	4
NUMBER OF TRUCK CAMPERS	3
NUMBER OF TRAILERS	13
NUMBER OF MOTERHOMES	5
SITES WITH BOATS	16 = 66%

COMMENTS:

PRICE O.K.	3
PRICE TO HIGH	10
NEED FIREWOOD	3
NEED ELECT.	9
NEED SHOWERS	8
GRASS TO HIGH	12
TRAIL TO BEACH	4
BEACH NEEDS WORK	7
MORE CAMP SITES	4
DRIVEWAYS BIGGER	3
U. S. SHOULD KEEP CAMPGROUNDS	1

BREVOORT LAKE

6-30-82 WED

UNIT #	NO. PERSONS	REPEAT	LENGTH OF STAY	TYPE OF VEHICLE	PETS	BIKES		BOATS		COMMENTS
						REG	MOTOR	ROW,	SAIL	POWER
#1	14	YES 8-Times	Week	Trucks (2)	1-Dog	-	-	-	-	Price is too high - but nice campground.
#3	4	YES 30 Yrs	10 Days	Trailer	-	-	-	-	1	Price too high - better fishing, beach needs work. Nice boat ramp - The grass is too high and bringing in the bugs. Next year he will bring his own lawn mower.
#6	7	NO	Week	Trailer (26 Ft)	1-Dog	-	-	-	1 (12 Ft)	Everything was fine except that the grass could be cut back some more - will be back
#7	2	NO	Week	Car Trailer (16 Ft)	-	-	-	-	-	Nice, clean and quite. Price is right for what you get. Grass should be cut back. Hope U.S. keeps the campground.
#8	4	ONCE	Week	Car Trailer (17 Ft)	-	4	-	-	-	Skunks again this year, got in trailer. Like the fire rings. More camp sites on lake. Good drinking water.
#11	8	YES 6-Times	Week	Motor Home (22 Ft)	-	2	-	-	1 (13 Ft)	Should have electricity at sites. Everything is clean. Beach should be kept clean. Some trees should be cut back from beach. Grass is not cut enough.
#14	4	YES 9 Yrs	Week	Trailer (24 Ft) Truck	-	4	-	-	1 (14 Ft)	Beach needs cleand up. Fishing is poor. Nice boat ramp. Need trails to beach to keep people out of camp sites.

UNIT #	NO. PERSONS	REPEAT	LENGTH OF STAY	TYPE OF VEHICLE	PETS	BIKES		BOATS		COMMENTS
						REG	MOTOR	ROW, SAIL,	POWER	
#16	2	YES 14 Yrs	10 Days	Trailer (23 Ft) Car	-	2	-	-	1 (14 Ft)	Some bad stumps near drieways. Showers would be nice. Driveways not wide enough.
#18	10	YES 10 Times	Week	Tent Camper (14 Ft)	1-Cat	-	-	-	1 (14 Ft)	Price too high. Beach needs work. Grass needs to be cut.
#13	2	NO	Week	Trailer (16 Ft)	2-Dogs	-	-	-	-	Beach needs to be cleaned up (broken glass). Price too high, I'am laid off work. Toilets nice and clean. Garbage always picked up. (What about the jets) Fire rings nice.
#24	3	NO	3-Days	Car Tent	1-Dog	-	-	-	1 (14 Ft)	Price? Why. Nice boat ramp.
#28	7	YES 25 Yrs	5-Days	Tent Trailer (17 Ft)	-	-	-	1 Row	-	What happened to the grass cutting? Can understand the price rate. Love the privacy.
#34	2	YES 7 Yrs	2-Weeks	Motor Home (30 Ft)	1-Dog	-	-	-	1 (15 Ft) 40 HP	Needs electricity. Also show room. Price too high for what we got. Fishing poor.
#35	6	YES 5 Yrs	2-Weeks	Trailer (27 Ft)	-	5	-	-	-	Showers or hot water in bathrooms. Plug ins in bath house. Price is right. Nice and clean. Grass needs cutting.
#36	5	YES 8 Yrs	1-Week	Trailer (17 Ft)	-	2	-	-	1 (14 Ft) 10 HP	Needs electricity. Grass needs to be cut. Garbage needs to be picked up more often. Showers and hot water would be nice.

UNIT #	NO. PERSONS	REPEAT	LENGTH OF STAY	TYPE OF VEHICLE	PETS	BIKES		BOATS		COMMENTS
						REG	MOTOR	ROW,	SAIL, POWER	
#38	2	YES 8 Yrs	1-Week	Trailer (18 Ft)	-	-	-	-	(14 Ft) 6 HP	Needs electricity. Price is too high without electricity and showers. Grass needs to be cut.
#40	4	YES 8 Yrs	1-Week	Trailer (23 Ft)	-	2	-	-	(13 Ft) 12 H	Price too high for what you get. Grass needs cutting. Driveways too hard to get into. Level lots for parking trailers. Needs more lots.
#46	3	NO	1-Week	Tent	-	-	-	-	(18 Ft) 70 HP	Needs electricity with pay station. Wooden boat docks. Price is O.K. Needs showers.
#50	4	YES 6 Times	2-Weeks	Tent & Van	-	4	-	-	-	Just love it. Keep it just the way it is.
#51	2	NO	1-Night	Car & Tent	-	-	-	-	(14 Ft)	Needs showers, but otherwise very nice.
#52	5	YES ONCE	3 Days	Tent & Camper	-	5	-	-	(12 Ft) Elect Motor	Price is too high and grass needs cutting.
#54	4	YES 5-Times	2-Weeks	Tent Camper	-	-	-	-	(14 Ft) 40 HP	Driveways need to be wider and longer. Very clean. Price is O.K.
#55	3	YES 6-Times	2-Days	Tent Camper	-	-	-	-	-	For \$6.00 you should get electricity. Someone needs to sell firewood. Park is very nice and clean.
#56	2	YES	1-Week	Motor Home	1-Dog	-	-	-	(14 Ft) 33 HP	Campgrounds look like hell. Grass is way too high. He said if I got him a lawn mower he would cut it. Too many bugs because of the grass. Was <u>very upset</u> .

CAMPER COMMENTS BREVOORT LAKE

1984

LOWER RATES	6
ELECTRICITY AT SITES	8
SHOWERS	9
CLEANER BATHROOMS	3
GARBAGE PICK-UP (MORE)	1
REMOVE BUMPER POSTS	13
ELECTRIC PLUGS IN BATHROOMS	4
PUBLIC TELEPHONE	2
PATH TO BEACH	1
CLEANER BEACH	2
MORE POLICE PROTECTION	2
PAVED DRIVEWAYS	1
CLOTHES HOOKS IN BATHROOMS	1
NO GRASS CUTTING BEFORE 10:00 A.M.	1
BAD TASTING WATER	3
BAN RUNNING GENERATORS	1
NO DOGS	2
DOORS TOO HIGH ON TOILET STALLS	1
ONE CAMPER PER SITE	1
FISH CLEANING STATION	4
BOAT DOCKS	1
LARGER BOAT LAUNCH AREA	5

BREVOORT LAKE
8-30-84

UNIT #	NO.	REPEAT	LENGTH OF STAY	TYPE OF VEHICLE	PETS	BIKES		BOATS			COMMENTS
	PERSONS					REG	MOTOR	ROW,	SAIL,	POWER	
2	4	3-Times	5-Days	Tent	-	-	-	-	-	-	Ohio. O.K. Price too high.
3	4	5-Times	9-Days	Tent Camper	-	2	-	-	-	-	Mich. O.K. Like the new bath houses.
25	4	3-Times	4-Days	Tent	-	2	-	-	-	-	Mich. Great, lots cleaner then the last time. Love the bathrooms.
28	7	3-Times	2-Weeks	Trailer	-	4	-	-	-	-	Col. Need telephone in camp. Water bad. Bathrooms are great.
52	3	NO	10-Days	Tent	1-Dog	-	-	-	-	2	Mich. O.K.
22	2	3-Times	1-Day	Camper	-	2	-	-	-	1	Ind. Electricity would be nice. Love the bathrooms.
2	2	NO	4-Days	Trailer	-	1	-	-	-	-	Wisc. Nice beach for swimming. Electricity at sites, would pay \$1.00 more.
11	3	2-Times	12-Days	Tent Motor Home	-	2	-	-	-	-	Mich. Dog crap everywhere. Just great, we will be back.

LAKE MICHIGAN CAMPGROUND VISITOR SURVEY SUMMARY 1982

THREE SURVEYS TAKEN: 6-30-82
 7-28-82

TOTAL NUMBER INTERVIEWS	37
TOTAL NUMBER PERSONS	124
AVERAGE NUMBER PERSONS PER SITE	3.35
REPEAT CUSTOMERS	19 = (52%)
AVERAGE LENGTH OF STAY	3.83 DAYS
NUMBER SITES WITH TENTS	25
NUMBER TRUCK CAMPERS	4
NUMBER TRAILERS	3
NUMBER MOTERHOME	5

COMMENTS:

PRICE O.K.	13
PRICE TO HIGH	4
NEED FIREWOOD	6
NEED ELECT.	3
NEED SHOWERS	8
GRASS TO HIGH	5
LIKE THE STAMP SAND	13
DISLIKE THE STAMP SAND	3
STAIRS TO BEACH	4
WILL BE BACK AGAIN	8
GOOD T.V. RECEPTION	1

IN 1982 THE REMODELING WAS COMPLETED AND THE PRICE WAS RAISED FROM \$4.00 to \$5.00.

LAKE MICHIGAN

6-30-82 WED

A-26

UNIT #	NO. PERSONS	REPEAT	LENGTH OF STAY	TYPE OF VEHICLE	PETS	BIKES		BOATS		COMMENTS
						REG	MOTOR	ROW,	SAIL, MOTOR	
9	4	NO	2-Days	Motor Home	1-Dog	-	1	-	-	Very nice camp. Price is right. Surprised of lack of use.
15	2	YES	1-Week	Van Tent	-	-	-	-	-	We were here before the park was remodeled and was glad that there were not too many trees removed. We understand about the price.
16	4	YES	2-Days	2-Cars Tent	-	-	-	-	-	Just love the privacy. Don't have to see your neighbors. Think the price is too high.
26	2	NO	2-Days	2-Bikes Tent	-	-	2	-	-	No place to get firewood. Needs showers. Liked the stamp sand as a tent pad. Will be back again.
33	2	YES	1-Day	Car Tent	-	-	-	-	-	Price is all right. Loved the stamp sand for sleeping on. Only thing it needs is <u>hot water</u> for shaving and showers.
6	3	NO	1-Night	Car Tent	-	-	-	-	-	Needs showers or a place to wash your hair. Liked the stamp sand to sleep on. Will be back again.
10	2	YES ONCE	3-Days	Car Tent	-	-	1	-	-	Needs new stairs to beach. Needs bike trails. Nobocy selling wood. Liked the bathrooms. Like the remodeling.
4	3	NO	1-Week	Car Tent	-	1	-	-	-	Would like to see showers. Camp is the nicest we have ever statyed at. Liked the stamp sand for tents. Was happy to see handicapped sites. Will be back again.

LAKE MICHIGAN
JULY 21, 1982

UNIT #	NO. PERSONS	REPEAT	LENGTH OF STAY	TYPE OF VEHICLE	PETS	BIKES		BOATS		COMMENTS
						REG	MOTOR	ROW,	SAIL, POWER	
8	6	NO	1 Week	Camper Mich	1-Dog	4	1	-	14 Ft 25 HP	Electricity (Pay as you use) would be nice. Like the stamp sand, like it very much. We'll come back.
11	2	NO	3 Nights	Truck Camper Nevada	-	-	-	-	-	Very quiet. Need a way to get to the beach. Price is O.K. Stamp sand is great. Very good fire pit. Good T.V. reception.
12	2	NO	3 Days	Car Tent Mich	-	-	-	-	-	Stayed at Brevoort one night until we found this place. It is quieter here. Showers would be nice. Like stamp sand. Price is fine.
13	6	YES 4	1 Week	Car Tent Mich	-	-	-	-	-	Need a way to get to the beach for the handicapped. Price is O.K. Picnic tables for handicapped would be nice. No one was selling firewood.
14	5	YES 3	1 Night	Trailer 19'	1-Dog	-	-	-	-	Electricity would be nice. The price is O.K.
17	5	YES 3	2 Weeks	Tent Car Mich	-	-	-	-	-	Quiet and nice. Open up camp site for more sun. Price is O.K. Need stairs to beach.
19	2	NO	1 Week	Car Tent Mich	1-Dog	-	-	-	-	Nicest campground in the forest. Need something to stop the sound of cars. Stamp sand is great. Price is a little too high.

UNIT #	NO. PERSONS	REPEAT	LENGHT OF STAY	TYPE OF VEHICLE	PETS	BIKES REG MOTOR		BOATS ROW, SAIL, POWER		COMMENTS
21	2	YES 2	3 Days	Car Mich Tent	-	-	-	-	-	Hot or cold showers would be nice. Like the privacy. Lots of room between camp sites. Like the stamp sand. Fire pit is great.
25	2	YES 2	1 Night	Van Mich	-	2	-	1 ROW (15 Ft)	-	Table is too far from fire pit. Price is O.K. Nice clean and very quiet. Grass is too high.
27	2	NO	1 Night	Tent Car Minn	-	-	-	-	-	Like the stamp sand. Price is a little too high. Liked our one night stay. Grass is too high.
31	3	YES 1	1 Night	Car Tent Mich	-	-	-	-	-	Didn't like the stamp sand. Bugs not bad. Price is right. Not as good as Porcupine Mountains.
30	3	NO	1 Week	Tent Car Mich	2-Dogs	-	-	-	-	Did not like the stamp sand, tracks into tent. Price is O.K. Great fire pits. Really like it, will be back.
32	3	YES 3	1 Week	Camper 13'	1-Dog	-	-	-	-	Picnic table is in bad shape. Grass is too high. Very nice camp site.
33	2	NO	4 DAYS	Van Wisc	1-Dog	-	-	-	-	Very quiet, except for trucks. Lots of room for the dog.
4	4	YES 2	1 Week	Car Tent Mich	1-Dog	-	-	-	-	Love it. Like the stamp sand. Like fire pits. Will be back again.

LAKE MICHIGAN

7-29-82

UNIT #	NO. PERSONS	REPEAT	LENGTH OF STAY	TYPE OF VEHICLE	PETS	BIKES		BOATS			COMMENTS
						REG	MOTOR	ROW	SAIL	POWER	
1	3	NO	1 Night	Tent Trailer	-	-	-	-	-	-	Very nice. Toilet very nice.
6	3	YES 50 Times	4 Days	Van Tent	-	-	-	Canoe 16 Feet	-	-	Keep it just the way it is. Loved the stamp sand. Doesn't want electricity. Price is alright.
7	3	YES Once	3 Days	Car Tent	-	-	-	-	-	-	Highway too close. Price is O.K. Stamp sand is nice. Nice fire pits.
8	4	NO	3 Days	Truck Tent	-	-	-	-	-	-	Don't put in showers. Toilets very nice. Need larger picnic tables. Didn't like tables chained down.
10	2	NO	1 Night	Car Tent	-	-	-	-	-	-	No one selling firewood. Liked the stamp sand. Fire pit alright. We'll be back again.
19	5	YES 8 Times	1 Week	Car Tent	1-Dog	-	-	-	-	-	Everything just fine.
20	6	YES 5 Times	4 Days	Car Tent	-	-	-	-	-	-	Don't like tables chained down. Don't like stamp sand. Liked the old blow sand. Price is O.K. Fire rings O.K.
23	4	YES Once	1 Night	Car Tent	-	-	-	-	-	-	Don't like tables chained down. Don't like stamp sand. Would like to see sites rustic. Everything else is just nice. We'll be back.

UNIT #	NO. PERSONS	REPEAT	LENGTH OF STAY	TYPE OF VEHICLE	PETS	BIKES		BOATS		COMMENTS
						REG	MOTOR	ROW,	SAIL, POWER	
26	5	NO	1 Week	Truck Tent	-	-	-	-	-	Really like it. Price is alright. Toilet paper is out.
27	6	NO	1 Week	Truck Camper	1-Dog 1-Cat	-	-	-	-	Road too close. Price is alright.
28	2	YES	2 Days	Car Tent	-	-	-	-	-	Very quiet. Price is too high, but all right.
32	4	NO	1 Night	Trailer 22 Foot	1-Dog	-	-	-	-	Road too close to beach. Camp site set up the wrong way for trailer door. Chain on table not long enough. We'll be back.
33	4	YES Once	2 Days	Car Tent	-	2	1	-	-	Very clean. Should have showers. Price is alright. Love the view. Grass could be kept better. Love it.
34	3	NO	1 Night	Van	-	-	-	-	-	Very nice. We'll be back.

CAMPER COMMENTS LAKE MICHIGAN1984

SHOWERS	4
FIRE WOOD PROVIDED	3
FREE CAMPING OVER 65	1
LOWER FEES	6
LEAVE ELECT. ON ALL DAY	1
PAVED WALK-WAYS TO BEACH	1
BETTER SIGNS	1
REMOVE HIGHWAY	1
ELECTRIC AT SITES	4
TRAILER WASTE STATION	1
FREE OVERNIGHT PARKING	1
MORE CAMP SITES	2
MORE INFORMATION	1
REMOVE STAMP SAND	1
BAD WATER	5
BETTER GRILLS ON FIRE RINGS	1
ENVELOPES THE SIZE OF DOLLARS	1
DISPLAY PERMITS ON SITE MARKER	2

LAKE MICHIGAN

8-30-84

UNIT #	NO. PERSONS	REPEAT	LENGTH OF STAY	TYPE OF VEHICLE	PETS	BIKES REG MOTOR	BOATS ROW, SAIL, POWER	COMMENTS
2	4	32-Times	7-Days	Tent Camper	-	- -	- -	Mich. Leave it alone. Stamp sand no good for kids.
16	2	3-Times	4-Days	Tent	-	- -	- -	Mich. Nice place, electricity would be nice.
24	2	NO	8-Days	Tent	-	- -	- -	Mich. Pit toilets smell. Firewood. Over 60 years old should be free.
26	3	2-Times	7-Days	Tent	1-Dog	- -	- -	Mich. Boat launch and peer.
30	4	4-Times	5-Days	Tent	-	- -	- -	Mich. Like the sites for tents. Price O.K.
29	2	2-Times	3-Days	Tent	-	- -	- 1	Mich. Like the beach, need camp store.

Appendix B

APPENDIX B

1 2 3 SITE	4 5 MONTH	6 7 DAY OF MONTH	8 9 YEAR	10 DAY OF WEEK	11 BOAT 1 SHORE 2 PIER 3	RESIDENCE	12 13	14	15	16	17	18 COMPLETE
19 20 LIC. ♂	21 22 UNLIC. ♂	23 24 LIC. ♀	25 26 UNLIC. ♀	BAIT USED		27 28	SPECIES SOUGHT		29 30			

TIME FISHED START FINISH

AM MORNING NOON EVENING PM

[illegible]

FOR NON-RESIDENTS ASK:

1) WHERE ARE YOU STAYING? _____

2) HOW LONG DO YOU PLAN TO STAY? _____

FOR BOAT FISHERMEN ASK:

1) WHERE DID YOU LAUNCH YOUR BOAT? _____

2) WHERE WOULD YOU LIKE A BOAT RAMP TO BE BUILT? _____

FOR INTERVIEWS AT THE BOAT RAMP IN THE BREVOORT LAKE CAMPGROUND ASK:

1) ARE YOU STAYING IN THE CAMPGROUND? _____

2) HOW LONG ARE YOU STAYING? _____

3) ABOUT WHAT PERCENT OF YOUR TRIP IS FOR FISHING? _____

COMMENTS OR RECOMMENDATIONS:

B-3

LAKE

Figure 2

Mon. 1, Tues. 2, Wed. 3, Thur. 4, Fri. 5, Sat. 6, Sun. 7, Holiday 8

1-3 4-6 7-8 9-10 11-12 13 14 15-16 17-19 | 20-21 22-24 25-26 27-29 30-31 32-34 35-36 37-39 40-41 42-44 45-46 47-49

[illegible]

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

INTEROFFICE COMMUNICATION

July 1, 1980

File: 6700
Big Mstg. Lk
Mackinac
Co.Ret. J.
J. Schrouder
MDNR
Newberry

TO: John D. Schrouder, District Fisheries Biologist,
Newberry

FROM: Roger N. Lockwood, Statistical Technician, Institute-
Ann Arbor

SUBJECT: 1978-1980 Big Manistique Creel Census

Attached are the Big Manistique Lake creel census estimates covering the Winter 1978-79, Summer 1979, and Winter 1979-80 periods.

For some of the estimates it was necessary to calculate variances by the use of a ratio of known mean and variance vs a known mean. However, this was used in only a few instances on weekend or weekday angler hours and/or catch per hour.

The confidence limits on catch estimates were quite large due to variability in catch rates between anglers and the low percentage of anglers interviewed (3.99% \pm 0.40% for Summer 1979). Additional census clerks would help improve future catch estimates. Estimated angler hours and trips are very good, so any additional clerks would be best utilized as interview clerks only.

I have completed the Cedarville estimates for Summer 1979 and will send them to you shortly. The Cedarville estimates for Winter 1979-80 should be finished within the next week or two.

If you have any questions concerning the attached estimates, please let me know.



RNL:bal
Encl.

cc: W. McClay
B. Ylkanen
W. C. Latta

Big Manistique Lake

December - February

1979-1980

Percentages are given with 2 standard errors in parenthesis

Percentage of Anglers by Bait Type

<u>Bait Used</u>	<u>December</u>	<u>January</u>	<u>February</u>	<u>Season</u>
Live	100.00% (0%)	56.94% (11.67%)	87.50% (8.84%)	74.83% (7.06%)
Artificial	0% (0%)	43.06% (11.67%)	12.50% (8.84%)	25.17% (7.06%)

Percentage of Anglers by Species Sought

<u>Species Sought</u>	<u>December</u>	<u>January</u>	<u>February</u>	<u>Season</u>
N. Pike	0% (0%)	44.44% (11.71%)	14.29% (9.35%)	26.49% (7.18%)
Y. Perch	0% (0%)	38.89% (11.49%)	46.43% (13.33%)	35.76% (7.80%)
Walleye	100.0% (0%)	16.67% (8.78%)	39.29% (13.05%)	37.75% (7.89%)

Percentage of Anglers by Fishing Methods

<u>Method</u>	<u>December</u>	<u>January</u>	<u>February</u>	<u>Season</u>
Spear	17.39% (15.81%)	43.06% (11.67%)	12.50% (8.84%)	27.81% (7.29%)
Hook & Line	82.61% (15.81%)	56.94% (11.67%)	87.50% (8.84%)	72.19% (7.29%)

Big Manistique Lake

December - February

1979-1980

Catches by Month and Season with 2 Standard Errors in Parenthesis

Total catch and fishing pressure

<u>Species</u>	<u>Total C/H</u>	<u>December</u>	<u>January</u>	<u>February</u>	<u>Season</u>
Cisco	.0023 (.0026)	0 (0)	4 (8)	15 (19)	19 (21)
N. Pike	.1512 (.0792)	403 (420)	458 (248)	404 (189)	1265 (523)
Y. Perch	1.0532 (.8610)	1892 (2510)	2246 (2248)	4673 (5703)	8811 (6624)
Walleye	.0312 (.0288)	106 (162)	114 (153)	41 (37)	261 (226)
W. Sucker	.0116 (.0151)	0 (0)	70 (109)	27 (55)	97 (122)
Total	1.2495 (.8904)	2401 (2550)	2892 (2269)	5160 (5707)	10453 (6650)
Angler Hours		3051 (2416)	3477 (1035)	1838 (557)	8366 (2687)
Angler Trips		1486 (1223)	942 (285)	558 (167)	2986 (1267)
% Interviewed		1.55% (1.27%)	7.64% (2.31%)	10.04% (3.00%)	5.06% (2.15%)

Percentage of Anglers by County of Residence per Month and Season

<u>County</u>	<u>December</u>	<u>January</u>	<u>February</u>	<u>Season</u>
Luce	56.52% (20.67%)	58.33% (11.62%)	71.43% (12.07%)	62.92% (7.86%)
Mackinac	43.48% (20.67%)	36.11% (11.32%)	25.00% (11.57%)	33.11% (7.66%)
Saginaw	0% (0%)	1.39% (2.76%)	0% (0%)	0.66% (1.32%)
Schoolcraft	0% (0%)	4.17% (4.71%)	3.57% (4.96%)	3.31% (2.91%)

Big Manistique Lake

December - February

1979-1980

Catches by Month and Season with 2 Standard Errors in Parenthesis

Estimated Open Ice catch and fishing pressure

<u>Species</u>	<u>Total C/H</u>	<u>December</u>	<u>January</u>	<u>February</u>	<u>Season</u>
Cisco	.0282 (.0321)	0 (0)	4 (8)	15 (19)	19 (21)
N. Pike	.0074 (.0164)	0 (0)	0 (0)	5 (11)	5 (11)
Y. Perch	1.7656 (1.1017)	206 (426)	331 (251)	653 (446)	1190 (666)
Walleye	.0668 (.0551)	10 (22)	5 (6)	30 (26)	45 (35)
Total	1.8680 (1.1158)	216 (427)	340 (251)	703 (447)	1259 (667)
Angler Hours		155 (129)	187 (59)	332 (120)	674 (186)
Angler Trips		38 (32)	54 (17)	82 (28)	174 (46)

Big Manistique Lake

December - February

1979-1980

Catches by Month and Season with 2 Standard Errors in Parenthesis

Estimated shanty catch and fishing pressure

<u>Species</u>	<u>Total C/H</u>	<u>December</u>	<u>January</u>	<u>February</u>	<u>Season</u>
N. Pike	.1638 (.0888)	403 (420)	458 (248)	399 (189)	1260 (523)
Y. Perch	.9908 (.9238)	1686 (2474)	1915 (2234)	4020 (5686)	7621 (6591)
Walleye	.0281 (.0306)	96 (160)	109 (153)	11 (26)	216 (223)
W. Sucker	.0126 (.0165)	0 (0)	70 (109)	27 (55)	97 (122)
Total	1.1953 (.9557)	2185 (2514)	2552 (2256)	4457 (5689)	9194 (6616)
Angler Hours		2896 (2413)	3290 (1033)	1506 (544)	7692 (2681)
Angler Trips		1448 (1223)	888 (284)	476 (165)	2812 (1266)

Big Manistique - 1979 - May to October

Percentages are Given with 2 Standard Errors in Parenthesis

Percentage of Anglers by Bait Used

<u>Bait Used</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug.</u>	<u>Sept.</u>	<u>Oct.</u>	<u>Season</u>
Live	85.45% (9.51%)	84.48% (6.72%)	94.34% (6.35%)	88.89% (9.37%)	94.85% (4.49%)	100.00% (0%)	89.97% (3.05%)
Artificial	14.55% (9.51%)	15.52% (6.72%)	5.66% (6.35%)	11.11% (9.37%)	5.15% (4.49%)	0% (0%)	10.03% (3.05%)

Percentage of Anglers by Species Sought

<u>Species Sought</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug.</u>	<u>Sept.</u>	<u>Oct.</u>	<u>Season</u>
N. Pike	0% (0%)	0% (0%)	0% (0%)	6.67% (7.44%)	6.19% (4.89%)	17.39% (15.81%)	3.34% (1.82%)
Y. Perch	0% (0%)	2.59% (2.95%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0.77% (0.89%)
Walleye	100.00% (0%)	97.41% (2.95%)	100.00% (0%)	93.33% (7.44%)	93.81% (4.89%)	82.61% (15.81%)	95.89% (2.01%)

Percentage of Anglers by Fishing Method

<u>Fishing Method</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug.</u>	<u>Sept.</u>	<u>Oct.</u>	<u>Season</u>
Hook & Line					100.00% (0%)	100.00% (0%)	100.00% (0%)

Big Manistique Lake - 1979 - May to October

Percentages are Given with 2 Standard Errors in Parenthesis

Percentage of Anglers by County of Residence per Month and Season

<u>County</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug.</u>	<u>Sept.</u>	<u>Oct.</u>	<u>Season</u>
Alger	5.45% (6.12%)	3.45% (3.39%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	1.80% (1.35%)
Calhoun	0% (0%)	0% (0%)	0% (0%)	0% (0%)	16.50% (7.54%)	0% (0%)	4.11% (2.01%)
Charlevoix	0% (0%)	0% (0%)	0% (0%)	4.44% (6.14%)	0% (0%)	0% (0%)	0.51% (0.73%)
Chippewa	1.82% (3.60%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0.26% (0.51%)
Genesee	5.45% (6.12%)	0% (0%)	16.98% (10.31%)	0% (0%)	0% (0%)	0% (0%)	3.08% (1.75%)
Ingham	0% (0%)	0% (0%)	0% (0%)	2.22% (4.39%)	0% (0%)	0% (0%)	0.26% (0.51%)
Ionia	0% (0%)	3.45% (3.39%)	0% (0%)	13.33% (10.13%)	0% (0%)	0% (0%)	2.57% (1.60%)
Jackson	9.09% (7.75%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	1.29% (1.14%)
Kalamazoo	0% (0%)	0% (0%)	0% (0%)	0% (0%)	8.25% (5.59%)	0% (0%)	2.06% (1.44%)
Kent	0% (0%)	7.76% (4.97%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	2.31% (1.52%)
Lapeer	0% (0%)	0% (0%)	0% (0%)	0% (0%)	4.12% (4.04%)	0% (0%)	1.03% (1.02%)
Livingston	0% (0%)	0% (0%)	0% (0%)	0% (0%)	2.06% (2.89%)	0% (0%)	0.51% (0.73%)
Luce	27.28% (12.01%)	35.35% (8.88%)	47.17% (13.71%)	35.57% (14.27%)	29.91% (9.30%)	60.87% (20.35%)	35.99% (4.87%)
Mackinac	20.00% (10.79%)	10.34% (5.66%)	22.64% (11.50%)	4.44% (6.14%)	11.34% (6.44%)	17.39% (15.81%)	13.37% (3.45%)
Missaukee	0% (0%)	0% (0%)	0% (0%)	0% (0%)	2.06% (2.39%)	0% (0%)	0.51% (0.73%)
Monroe	0% (0%)	0% (0%)	0% (0%)	0% (0%)	2.06% (2.89%)	0% (0%)	0.51% (0.73%)
Muskegon	0% (0%)	0% (0%)	3.77% (5.23%)	0% (0%)	0% (0%)	0% (0%)	0.51% (0.73%)

Percentage of Anglers by County of Residence per Month and Season

<u>County</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug.</u>	<u>Sept.</u>	<u>Oct.</u>	<u>Season</u>
Oakland	0% (0%)	0% (0%)	0% (0%)	0% (0%)	1.03% (2.05%)	0% (0%)	0.26% (0.51%)
Oscoda	0% (0%)	3.45% (3.39%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	1.03% (1.02%)
Roscommon	3.64% (5.05%)	6.90% (4.71%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	2.57% (1.60%)
Saginaw	5.45% (6.12%)	0% (0%)	0% (0%)	0% (0%)	0% (0%)	4.35% (8.50%)	1.03% (1.02%)
St. Clair	0% (0%)	6.03% (4.42%)	1.89% (3.74%)	0% (0%)	0% (0%)	0% (0%)	2.06% (1.44%)
Schoolcraft	0% (0%)	4.31% (3.77%)	0% (0%)	4.44% (6.14%)	2.06% (2.89%)	0% (0%)	2.31% (1.52%)
Wayne	12.73% (8.99%)	5.17% (4.11%)	7.55% (7.26%)	4.44% (6.14%)	4.12% (4.04%)	0% (0%)	5.91% (2.39%)
Out-of-State	9.09% (7.75%)	13.79% (6.40%)	0% (0%)	31.12% (13.80%)	16.49% (7.54%)	17.39% (15.81%)	14.15% (3.53%)

Big Manistique - 1979 - May to November

Catches by Month and Season with 2 Standard Errors in Parenthesis

Estimated Total Catch and Fishing Pressure

<u>Species</u>	<u>Total C/H</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug.</u>	<u>Sept.</u>	<u>Oct.</u>	<u>Nov.</u>	<u>Season</u>
Brook Trout	.0004 (.0008)	15 (32)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	15 (32)
Cisco	.0031 (.0064)	115 (240)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	115 (240)
N. Pike	.0188 (.0115)	0 (0)	73 (105)	162 (178)	70 (72)	335 (348)	69 (120)	0 (0)	709 (428)
Y. Perch	.2165 (.1168)	2691 (3474)	3102 (2321)	110 (199)	509 (352)	1741 (1131)	11 (24)	0 (0)	8164 (4347)
Walleye	.1346 (.0486)	2129 (1540)	1122 (469)	472 (528)	606 (397)	719 (361)	26 (41)	0 (0)	5074 (1778)
Sm. Bass	.0321 (.0160)	88 (125)	23 (32)	117 (209)	860 (527)	123 (124)	0 (0)	0 (0)	1211 (595)
Rock Bass	.0044 (.0063)	0 (0)	38 (76)	0 (0)	0 (0)	128 (225)	0 (0)	0 (0)	166 (238)
W. Sucker	.0015 (.0031)	58 (117)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	58 (117)
Total	.4114 (.1313)	5096 (3812)	4358 (2372)	861 (627)	2045 (751)	3046 (1264)	106 (129)	0 (0)	15512 (4767)
Angler Hours		7712 (1436)	9285 (1328)	6630 (1346)	5984 (1388)	7340 (1676)	751 (489)	0 (0)	37702 (3257)
Angler Trips		2588 (632)	2959 (444)	2315 (535)	1927 (470)	1760 (476)	296 (214)	0 (0)	11845 (1173)
% Interviewed		2.13 (.52)	3.92 (.59)	2.29 (.53)	4.51 (1.10)	5.51 (1.49)	7.77 (5.62)	0 (0)	3.99 (.40)

Big Manistique - 1979 - May to November

Catches by Month and Season with 2 Standard Errors in Parenthesis

Estimated Shore Catch and Fishing Pressure

<u>Species</u>	<u>Total C/H</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug.</u>	<u>Sept.</u>	<u>Oct.</u>	<u>Nov.</u>	<u>Season</u>
N. Pike	0.2857 (1.2884)	0 (0)	0 (0)	0 (0)	0 (0)	88 (307)	0 (0)	0 (0)	88 (307)
Angler Hours		0 (0)	0 (0)	0 (0)	0 (0)	308 (880)	0 (0)	0 (0)	308 (880)
Angler Trips		0 (0)	0 (0)	0 (0)	0 (0)	88 (252)	0 (0)	0 (0)	88 (252)

Big Manistique - 1979 - May to November

Catches by Month and Season with 2 Standard Errors in Parenthesis

Estimated Boat Catch and Fishing Pressure

<u>Species</u>	<u>Total C/H</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug.</u>	<u>Sept.</u>	<u>Oct.</u>	<u>Nov.</u>	<u>Season</u>
Brook Trout	.0004 (.0009)	15 (32)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	15 (32)
Cisco	.0031 (.0065)	115 (240)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	115 (240)
N. Pike	.0166 (.0081)	0 (0)	73 (105)	162 (178)	70 (72)	247 (163)	69 (120)	0 (0)	621 (298)
E. Perch	.2183 (.1117)	2691 (3474)	3102 (2321)	110 (199)	509 (352)	1741 (1131)	11 (24)	0 (0)	8164 (4347)
Walleye	.1357 (.0489)	2129 (1540)	1122 (469)	472 (528)	606 (397)	719 (361)	26 (41)	0 (0)	5074 (1778)
Sm. Bass	.0324 (.0161)	88 (125)	23 (32)	117 (209)	860 (527)	123 (124)	0 (0)	0 (0)	1211 (595)
Rock Bass	.0044 (.0063)	0 (0)	38 (76)	0 (0)	0 (0)	128 (225)	0 (0)	0 (0)	166 (238)
W. Sucker	.0016 (.0032)	58 (117)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	58 (117)
Total	.4125 (.1318)	5096 (3812)	4358 (2372)	861 (627)	2045 (751)	2958 (1226)	106 (129)	0 (0)	15424 (4757)
Angler Hours		7712 (1436)	9285 (1328)	6630 (1346)	5984 (1388)	7032 (1426)	751 (489)	0 (0)	37394 (3136)
Angler Trips		2588 (632)	2959 (444)	2315 (535)	1927 (470)	1672 (404)	296 (214)	0 (0)	11757 (1146)

Big Manistique Lake

B-15

December - February

1978-1979

Percentage of Anglers by County of Residence per Month and Season

<u>County</u>	<u>December</u>	<u>January</u>	<u>February</u>	<u>Season</u>
Luce	56.25% (24.80%)	100.00% (0%)	62.50% (24.21%)	62.85% (16.33%)
Mackinac	37.50% (24.21%)	0% (0%)	37.50% (24.21%)	34.29% (16.05%)
Schoolcraft	6.25% (12.10%)	0% (0%)	0% (0%)	2.86% (5.63%)

Percentage of Anglers by Bait Type

<u>Bait Used</u>	<u>December</u>	<u>January</u>	<u>February</u>	<u>Season</u>
Live	50.00% (25.00%)	33.33% (54.43%)	100.00% (0%)	71.43% (15.27%)
Artificial	50.00% (25.00%)	33.33% (54.43%)	0% (0%)	25.71% (14.78%)
Both	0% (0%)	33.33% (54.43%)	0% (0%)	2.86% (5.63%)

Percentage of Anglers by Species Sought

<u>Species</u>	<u>December</u>	<u>January</u>	<u>February</u>	<u>Season</u>
N. Pike	0% (0%)	33.33% (54.43%)	0% (0%)	2.86% (5.63%)
Y. Perch	12.50% (16.54%)	0% (0%)	0% (0%)	40.00% (16.56%)
Walleye	87.50% (16.54%)	66.67% (54.43%)	100.00% (0%)	57.14% (16.73%)

Big Manistique Lake

December - February

1978-1979

Catches by Month and Season with 2 Standard Errors in Parenthesis

Estimated total catch and fishing pressure

<u>Species</u>	<u>Total C/H</u>	<u>December</u>	<u>January</u>	<u>February</u>	<u>Season</u>
N. Pike	.0115 (.0254)	0 (0)	42 (92)	0 (0)	42 (92)
Y. Perch	.5877 (.3743)	1024 (1093)	417 (394)	697 (532)	2138 (1278)
Walleye	.3073 (.1554)	68 (58)	314 (223)	736 (454)	1118 (509)
Total	.9065 (.4283)	1092 (1095)	773 (462)	1433 (699)	3298 (1379)
Angler Hours		1435 (486)	925 (426)	1278 (472)	3638 (800)
Angler Trips		326 (129)	487 (282)	260 (97)	1073 (325)
% Interviewed		4.91% (1.94%)	0.62% (0.36%)	6.15% (2.30%)	3.26% (0.99%)

Big Manistique Lake

December - February

1978-1979

Catches by Month and Season with 2 Standard Errors in Parenthesis

Estimated Shanty Catch and Fishing Pressure

<u>Species</u>	<u>Total C/H</u>	<u>December</u>	<u>January</u>	<u>February</u>	<u>Season</u>
N. Pike	.0495 (.1100)	0 (0)	42 (92)	0 (0)	42 (92)
Y. Perch	.4912 (.6444)	73 (72)	151 (331)	193 (400)	417 (524)
Walleye	.2509 (.3726)	68 (58)	0 (0)	145 (300)	213 (306)
Total	.7915 (.7823)	141 (92)	193 (344)	338 (500)	672 (614)
Angler Hours		238 (129)	372 (265)	239 (124)	849 (320)
Angler Trips		56 (33)	92 (84)	60 (33)	208 (96)

Estimated Open Ice Catch and Fishing Pressure

<u>Species</u>	<u>Total C/H</u>	<u>December</u>	<u>January</u>	<u>February</u>	<u>Season</u>
Y. Perch	.6171 (.4484)	951 (1091)	266 (213)	504 (351)	1721 (1166)
Walleye	.3245 (.1690)	0 (0)	314 (223)	591 (341)	905 (407)
Total	.9416 (.5073)	951 (1091)	580 (308)	1095 (489)	2626 (1235)
Angler Hours		1197 (469)	553 (333)	1039 (455)	2789 (733)
Angler Trips		270 (125)	395 (269)	200 (91)	865 (310)

Appendix C

Appendix C

INVESTMENT ANALYSIS PROGRAM US#3 - FAST VERSION

C-1

PROBLEM - 20 YR S SHORE BREVOORT LKE DUNE

FISHERY AND HABITAT IMPROVEMENT 20 YR

O.M.B. RATE
.1000OPT. INT. RATE
.0400RANKING RATE
.0400

	VALUE		YEARS	TOTAL UNITS	FIRST YEAR TOTAL DOLLARS	\$ DISCOUNTED AT 4.00%	
	TYPE	BEGIN END				COST OR INCOME	COST
1 COST	1	1 1	1	.00	-6000.00	-6000.00	.00
2 COST	1	2 2	2	.00	-450000.00	-432692.31	.00
3 BENEFIT	2	1 3	3	.00	3740.00	.00	10656.35
4 BENEFIT	2	4 4	4	.00	5280.00	.00	20396.41
5 BENEFIT	2	7 12	12	.00	5950.00	.00	18460.21
6 BENEFIT	2	13 20	20	.00	7992.00	.00	33403.37
7 BENEFIT	2	3 20	20	.00	257000.00	.00	255943.84
TOTALS =						-438692.31	2743055.16

SUMMARY REPORT
LISTING OF COMBINED ITEMS
DISCOUNTED AT 4.00%
FOR PROBLEM 20 YR S SHORE BREVOORT LKE DUNE

SEL. NO.	COMBINATION NO.	COST	BENEFIT
1		-6000.00	.00
2		-432692.31	.00
3		.00	10656.35
4		.00	20396.41
5		.00	18460.21
6		.00	33403.37
7		.00	255943.84
TOTALS=		-438692.31	2743055.16

 EVALUATION OF PROJECT OR PROGRAM

C-2

PERCENT USED	BENEFIT COST RATIO	NET PRESENT WORTH	ANNUAL EQUIVALENT VALUE OF NPW	YEARS PLANNED
Q.M.B. RATE				
10.00	3.3540	1060141.44	124523.92	20
STD TEST RATE				
3.00	4.9375	2629638.28	176756.41	20
STD TEST RATE				
15.00	2.7724	545261.52	87111.34	0
OPT. RATE				
4.00	4.2523	2304357.37	169559.15	20

INTERVAL RATE OF RETURN IS 22.19 PERCENT

>READY

NATIONAL FOREST - HIAWATHA NATIONAL FOREST

UNIT - ST CASH

ATTENTION - TEE HIAWATHA

INVESTMENT ANALYSIS PROGRAM USES - FAST VERSION

C-3

PROBLEM - 50 YRS 5 SHORE REVCORT LK DUNE S

FISH, WIL, NAT/ASAP IMPROVEMENT 50 YRS

O.M.R. RATE
.1000

OPT. INT. RATE
.0400

RANKING RATE
.0400

	VALUE - YEARS			TOTAL UNITS PER YEAR	FIRST YEAR TOTAL DOLLARS COST OR INCOME	\$ DISCOUNTED AT 4.00%	
	TYPE	BEGIN	END			COST	BENEFIT
1 COST	1	1	1	.00	-6000.00	-6000.00	.00
2 COST	1	2	2	.00	-450000.00	-432692.31	.00
3 COST	1	25	25	.00	-50000.00	-19506.03	.00
4 BENEFIT	2	1	3	.00	3240.00	.00	10656.35
5 BENEFIT	2	4	3	.00	5230.00	.00	20396.41
6 BENEFIT	2	3	12	.00	6960.00	.00	15460.21
7 BENEFIT	2	13	50	.00	7992.00	.00	96530.11
8 BENEFIT	2	5	50	.00	267000.00	.00	4766561.06
TOTALS =						-458198.38	4913254.12

SUMMARY REPORT
LISTING OF COMBINED ITEMS
DISCOUNTED AT 4.00%
FOR PROBLEM 50 YRS 5 SHORE REVCORT LK DUNE S

SER. NO. COMBINATION NO.

COST BENEFIT

1	-6000.00	.00
2	-432692.31	.00
3	-19506.03	.00
4	.00	10656.35
5	.00	20396.41
6	.00	15460.21
7	.00	96530.11
8	.00	4766561.06
TOTALS=		-458198.38 4913254.12

 EVALUATION OF PROJECT OR PROGRAM

PERCENT USED	BENEFIT-COST RATIO	NET PRESENT WORTH	ANNUAL EQUIVALENT VALUE OF NPW	YEARS PLANNED
CONC. RATE 10.00	4.4282	1440397.94	145277.35	50
STD TEST RATE 3.00	12.9562	553934.25	217234.22	3
STD TEST RATE 13.00	8.6335	653937.37	98166.19	50
OPT. RATE 4.00	10.7230	4455055.75	207393.75	50

INTERNAL RATE OF RETURN IS 24.70 PERCENT

>READY
 >

PROBLEM - 100 YR S SHORE AREVOORT LK DUNE

O.M.B. RATE
.1000OPT. INT. RATE
.0400RANKING RATE
.0400

FISH WL. WATERFRESH IMPROVEMENT 100 YRS

	VALUE	YEARS		TOTAL UNITS	FIRST YEAR TOTAL DOLLARS	\$ DISCOUNTED AT 4.00%	
		TYPE	BEGIN END			COST	BENEFIT
				PER YEAR	COST OR INCOME		
1 COST	1	1	1	.00	-6000.00	-6000.00	.00
2 COST	1	2	2	.00	-45000.00	-432692.31	.00
3 COST	1	25	25	.00	-50000.00	-19506.03	.00
4 COST	1	75	75	.00	-50000.00	-2744.75	.00
5 BENEFIT	2	1	3	.00	740.00	.00	10656.35
6 BENEFIT	2	4	9	.00	5250.00	.00	20396.41
7 BENEFIT	2	9	12	.00	6750.00	.00	19460.21
8 BENEFIT	2	13	100	.00	7992.00	.00	120332.45
9 BENEFIT	2	5	100	.00	257000.00	.00	5573652.75
					TOTALS =	-460943.17	5744504.12

SUMMARY REPORT
LISTING OF COMBINED ITEMS
DISCOUNTED AT 4.00%
FOR PROBLEM 100 YR S SHORE AREVOORT LK DUNE

SEQ. NO.	COMBINATION NO.	COST	BENEFIT
1		-6000.00	.00
2		-432692.31	.00
3		-19506.03	.00
4		-2744.75	.00
5		.00	10656.35
6		.00	20396.41
7		.00	19460.21
8		.00	120332.45
9		.00	5573652.75
TOTALS=		-460943.13	5744504.12

 EVALUATION OF PROJECT OR PROGRAM

C-6

PERCENT USED	BENEFIT COST RATIO	NET PRESENT WORTH	ANNUAL EQUIVALENT VALUE OF NPW	YEARS PLANNED
0.4.0. 4.71				
10.00	4.4530	146350.48	146360.67	0
STD TEST RATE 1.00	16.2140	7197741.19	227784.53	100
STD TEST RATE 15.00	7.2627	455525.93	98328.97	100
CPT. RATE 1.00	12.4625	5283561.06	215611.56	100
INTERNAL RATE OF RETURN IS 25.70 PERCENT				

NATIONAL FOREST - MIKATPA NATIONAL FOREST

UNIT - ST IGNACE

ATTENTION - TED BEAUVAIS

INVESTMENT ANALYSIS PROGRAM USES - FAST VERSION

C - 7

PROBLEM - 20 YRS GROUP CAMPING BREVOORT

20 YRS GROUP CAMPING BREVOORT

2.4.9. RATE
.1000

OPT. INT. RATE
.0400

RANKING RATE
.0400

	VALUE		YEARS		TOTAL UNITS PER YEAR	FIRST YEAR TOTAL DOLLARS	\$ DISCOUNTED AT 4.00%	
	TYPE	BEGIN	END	COST OR INCOME		COST	BENEFIT	
1 COST	1	1	1		.00	-1000.00	-1000.00	.00
2 COST	1	2	2		.00	-14050.00	-13509.62	.00
3 MTIC	2	2	20		.00	-710.00	-9325.10	.00
4 BENEFIT	2	3	20		.00	3000.00	.00	35112.69
TOTALS =						-23834.71	35112.69	

SUMMARY REPORT
LISTING OF COMBINED ITEMS
DISCOUNTED AT 4.00%
FOR PROBLEM 20 YRS GROUP CAMPING BREVOORT

SEQ. NO.	COMBINATION NO.	COST	BENEFIT
1		-1000.00	.00
2		-13509.62	.00
3		-9325.10	.00
4		.00	35112.69
TOTALS =		-23834.71	35112.69

EVALUATION OF PROJECT OR PROGRAM

C - 8

PERCENT USED -----	BENEFIT COST RATIO -----	\$ NET PRESENT WORTH -----	\$ ANNUAL EQUIVALENT VALUE OF N P W -----	YEARS PLANNED -----
O.N.B. RATE 10.00	1.0316	622.26	73.09	20
STD TEST RATE 3.00	1.5676	14001.33	946.49	20
STD TEST RATE 15.00	.7820	-3717.27	-593.88	20
OPT. RATE 4.00	1.4732	11277.95	829.95	20
INTERNAL RATE OF RETURN IS 10.55 PERCENT *****				

NATIONAL FOREST - HIAWATHA NATIONAL FOREST

PROBLEM - ALT 1 20 YRS LAKE MI CAMPGROUND

REC DEVELOPMENT REHAB ALT 1 20 YRS

D. M. B. RATE
.1000

OPT. INT. RATE
.0400

RANKING RATE
.0400

C - 9

	VALUE		YEARS		TOTAL UNITS PER YEAR	FIRST YEAR TOTAL DOLLARS COST OR INCOME	% DISCOUNTED AT 4.00 COST BENEFIT	
	TYPE	BEGIN	END					
1 COST	1	1	1		.00	-2000.00	-2000.00	.00
2 COST	1	2	2		.00	-38500.00	-36538.46	.00
3 COST	2	3	20		.00	-2600.00	-31648.24	.00
4 BENEFIT	2	3	20		.00	8190.00	.00	95857.65
TOTALS =						-70186.70	95857.65	

SUMMARY REPORT LISTING OF COMBINED ITEMS DISCOUNTED AT 4.00% FOR PROBLEM ALT 1 20 YRS LAKE MI CAMPGROUND

SEQ. NO.	COMBINATION NO.	COST	BENEFIT
1		-2000.00	.00
2		-36538.46	.00
3		-31648.24	.00
4		.00	95857.65
TOTALS-		-70186.70	95857.65

COST/BENEFIT ITEM DIFFERENCES FROM SPECIFIED E

C-10

NOTE- WHEN EITHER A COST OR BENEFIT ITEM OF THE ALTERNATIVE IS COMPARED WITH THE BASE AND IS GREATER, THE DIFFERENCE WILL SHOW AS A POSITIVE VALUE. WHEN THE DIFFERENCE IS LESS, THE VALUE IS NEGATIVE.

PROBLEM-ALT 1 20 YRS LAKE MI CAMPGROUND COMPARED TO BASE

SEQ NO.	ITEM	DISCOUNTED AT 4.00%	
		COST	BENEFIT
1	COST	1500.	
2	COST	16346.	
3	COST	7912.	
4	BENEFIT		21302.

 EVALUATION OF PROJECT OR PROGRAM

C - 11

PERCENT USED		BENEFIT COST RATIO	\$ NET PRESENT WORTH	\$ ANNUAL EQUIVALENT VALUE OF NPW	YEARS PLANNED
D. M. B. RATE					
	10.00	.9923	-418.57	-49.17	20
STD TEST RATE	3.00	1.4424	32564.37	2188.84	20
STD TEST RATE	15.00	.7761	-10948.64	-1749.17	20
OPT. RATE	4.00	1.3658	25670.95	1888.91	20
INTERNAL RATE OF RETURN IS		9.85 PERCENT			

NATIONAL FOREST - HIAWATHA NATIONAL FOREST

UNIT - ST IGNACE

ATTENTION - TED BEAUVAIS

C - 12

INVESTMENT ANALYSIS PROGRAM USFS - FAST VERSION

PROBLEM - 20 YRS LAKE MI CAMPGROUND EXPANS

REC DEVELOPMENT REHAB 20 YRS

O. M. B. RATE
.1000

OPT. INT. RATE
.0400

RANKING RATE
.0400

	VALUE		YEARS		TOTAL UNITS PER YEAR	FIRST YEAR TOTAL DOLLARS COST OR INCOME	% DISCOUNTED AT 4.00 COST BENEFIT	
	TYPE	BEGIN	END					
1 COST	1	1	1		.00	-500.00	-500.00	.00
2 COST	1	2	2		.00	-21000.00	-20192.31	.00
3 COST	2	3	20		.00	-1950.00	-23736.18	.00
4 BENEFIT	2	3	20		.00	6370.00	.00	74555.95
TOTALS =						-44428.49	74555.95	

SUMMARY REPORT
LISTING OF COMBINED ITEMS
DISCOUNTED AT 4.00%
FOR PROBLEM 20 YRS LAKE MI CAMPGROUND EXPANS

SEQ. NO.	COMBINATION NO.	COST	BENEFIT
1		-500.00	.00
2		-20192.31	.00
3		-23736.18	.00
4		.00	74555.95
TOTALS-		-44428.49	74555.95

*****<<<*****
 EVALUATION OF PROJECT OR PROGRAM
 *****<<<*****

C-13

PERCENT USED		BENEFIT COST RATIO	\$ NET PRESENT WORTH	\$ ANNUAL EQUIVALENT VALUE OF NPW	YEARS PLANNED
Q. M. B. RATE					
	10.00	1.2651	9046.25	1062.57	20
STD TEST RATE	3.00	1.7598	35654.14	2396.52	20
STD TEST RATE	15.00	1.0125	364.41	58.22	20
OPT. RATE	4.00	1.6781	30127.46	2216.83	20

INTERNAL RATE OF RETURN IS 15.27 PERCENT

-----INVEST-----
 A COMPUTER PROGRAM
 TO EVALUATE FORESTRY
 INVESTMENT OPPORTUNITIES

FORESTRY ORGANIZATION - MIWATTA NATIONAL FOREST
 ORGANIZATION SUBDIVISION - ST IGNACE RANGER DISTRICT
 ANALYST - TED BEAUVAIS

C - 14

 *PROJECT OR PROGRAM - LAKE MICHIGAN CG EXPANSION *
 *BASE PROBLEM OR ALTERNATIVE - FINAL ALTERNATIVE *

OPT1 RATE
 10.00

OPT2 RATE
 4.00

RANKING RATE
 4.00

INFLATN. RATE
 .00

SEQ. NO.	ITEM	PAYMT TYPE	YEARS		INCRD VALUE RATE	BEGINNING YEAR NONDISCOUNTED TOTAL VALUE	\$ DISCOUNTED AT COST	4.00% BENEFIT
----	----	----	BEGIN	END	----	----	----	-----
1	COST	1	1	1	.00	-500.00	-490.77	.00
2	COST	1	2	2	.00	-17000.00	-15717.46	.00
3	COST	2	3	20	.00	-1800.00	-21067.62	.00
4	BENEFIT	2	3	20	.00	5460.00	.00	63905.11
						TOTALS =	-37265.84	63905.11

 * EVALUATION OF PROJECT OR PROGRAM *
 * INFLATION RATE: .00% *
 * PLANNING PERIOD: 20 YEARS *

DISCOUNT RATES

CRITERIA	OPT2 4.00%	RANK 4.00%	STC 5.00%	OPT 10.00%	STD 10.00%
BENEFIT-COST RATIO	1.71	1.71	1.65	1.39	1.39
PRESENT NET WORTH	26639.27	26639.27	22910.56	10303.45	10303.45
ANNUAL EQUIVALENT VALUE OF PNW	1960.16	1960.16	1938.40	1210.24	1210.24
LAND EXPECTATION VALUES --LEV1	49004.10	49004.10	36768.05	12102.39	12102.39
--LEV2	49004.10	49004.10	36768.05	12102.39	12102.39
INTERNAL RATES OF RETURN:					
IRR = 20.01%					
IRR1 = 20.01%					
IRR2 = 20.01%					

NOTE: - PNW AND IRR ARE BASED ON ONE PLANNING PERIOD,
 ***** INCLUDING INFLATION AND VALUE INCREASES.
 - LEV1 AND IRR1 ARE BASED ON PERPETUAL SERIES OF PLANNING PERIODS,
 INFLATION AND VALUE INCREASES CONTINUING BEYOND FIRST PLANNING PERIOD.
 - LEV2 AND IRR2 ARE BASED ON PERPETUAL SERIES OF PLANNING PERIODS,
 INFLATION AND VALUE INCREASES STOPPING AFTER FIRST PLANNING PERIOD.

NATIONAL FOREST - HIAWATHA NATIONAL FOREST

UNIT - ST IGNACE

ATTENTION - TED BEAUVAIS

C - 16

INVESTMENT ANALYSIS PROGRAM USFS - FAST VERSION

PROBLEM - 10 SITES BREVDORT ELECTRIFICATIO

REC DEVELOPMENT IMPR 10 SITES

O. M. B. RATE
.1000

OPT. INT. RATE
.0400

RANKING RATE
.0400

	VALUE	YEARS		TOTAL UNITS	FIRST YEAR TOTAL DOLLARS	% DISCOUNTED AT	%
	TYPE	BEGIN	END	PER YEAR	COST OR INCOME	COST	BENEFIT
1 COST	1	1	1	.00	-4000.00	-4000.00	.00
2 COST	2	2	20	.00	-200.00	-2626.79	.00
3 BENEFIT	2	2	20	.00	1000.00	.00	12628.79
					TOTALS =	-6626.79	12628.79

SUMMARY REPORT
LISTING OF COMBINED ITEMS
DISCOUNTED AT 4.00%
FOR PROBLEM 10 SITES BREVDORT ELECTRIFICATIO

SEQ. NO.	COMBINATION NO.	COST	BENEFIT
1		-4000.00	.00
2		-2626.79	.00
3		.00	12628.79
TOTALS-		-6626.79	12628.79

 EVALUATION OF PROJECT OR PROGRAM

C-17

	PERCENT USED	BENEFIT COST RATIO	\$ NET PRESENT WORTH	\$ ANNUAL EQUIVALENT VALUE OF NPW	YEARS PLANNED
D. M. B. RATE	10.00	1.3405	1931.49	226.87	20
STD TEST RATE					
	3.00	2.0258	7041.84	473.32	20
STD TEST RATE	15.00	1.0287	150.12	23.98	20
OPT. RATE	4.00	1.9057	6002.00	441.64	20

INTERNAL RATE OF RETURN IS 15.55 PERCENT

NATIONAL FOREST - HIAWATHA NATIONAL FOREST

PROBLEM - 40 SITES BREVOORT ELECTRIFICATIO

REC DEVELOPMENT IMPRV 40 SITES

O. M. B. RATE
.1000

OPT. INT. RATE
.0400

RANKING RATE
.0400

C - 18

	VALUE	YEARS		TOTAL UNITS	FIRST YEAR TOTAL DOLLARS	% DISCOUNTED AT 4.00	
	TYPE	BEGIN	END	PER YEAR	COST OR INCOME	COST	BENEFIT
1 COST	1	1	1	.00	-14400.00	-14400.00	.00
2 COST	2	2	20	.00	-640.00	-8405.72	.00
3 BENEFIT	2	2	20	.00	3200.00	.00	40412.12
TOTALS =						-22805.72	40412.12

SUMMARY REPORT
LISTING OF COMBINED ITEMS
DISCOUNTED AT 4.00%
FOR PROBLEM 40 SITES BREVOORT ELECTRIFICATIO

SEQ. NO.	COMBINATION NO.	COST	BENEFIT
1		-14400.00	.00
2		-8405.72	.00
3		.00	40412.12
TOTALS-		-22805.72	40412.12

COST/BENEFIT ITEM DIFFERENCES FROM SPECIFIED E

C - 19

NOTE- WHEN EITHER A COST OR BENEFIT ITEM OF THE ALTERNATIVE IS COMPARED WITH THE BASE AND IS GREATER, THE DIFFERENCE WILL SHOW AS A POSITIVE VALUE. WHEN THE DIFFERENCE IS LESS, THE VALUE IS NEGATIVE.

PROBLEM-40 SITES BREVOORT ELECTRIFICATION COMPARED TO BASE

SEQ NO.	ITEM	DISCOUNTED AT 4.00%	
		COST	BENEFIT
1	COST	10400.	
2	COST	5779.	
3	BENEFIT		27783.
DISCOUNTED NET CHANGE FROM BASE-		16179.	27783.

 EVALUATION OF PROJECT OR PROGRAM

C - 20

	PERCENT USED	BENEFIT COST RATIO	\$ NET PRESENT WORTH	\$ ANNUAL EQUIVALENT VALUE OF NPW	YEARS PLANNED
1. M.B. RATE					
STD TEST RATE	10.00	1.2319	4580.76	538.05	20
STD TEST RATE	3.00	1.8883	20933.88	1407.09	20
STD TEST RATE	15.00	.9390	-1119.62	-178.87	20
OPT. RATE	4.00	1.7720	17606.40	1295.51	20
INTERNAL RATE OF RETURN IS 13.78 PERCENT					

C-21

PROJECTS RANKED BY THEIR INTERNAL RATE OF RETURN

PROBLEM TITLE	NPW AT		COST 1ST YR	DOLLARS-NONDISCOUNTED			4TH YR	5TH YR	ACCUMUL	
	4.00%	IRR		2ND YR	3RD YR				1ST	5YR COST
10 SITES BREVOORT ELECTRI	6002.00	13.56	4000.00	200.00	200.00		200.00	200.00		4800.00
40 SITES BREVOORT ELECTRI	17606.40	13.78	14400.00	640.00	640.00		640.00	640.00		16960.00

PROJECTS RANKED BY THEIR NET PRESENT WORTHS AT 4.00 PERCENT

PROBLEM TITLE	NPW AT		COST 1ST YR	DOLLARS-NONDISCOUNTED			4TH YR	5TH YR	ACCUMUL 1ST 5YR COST
	4.00%	IRR		2ND YR	3RD YR				
40 SITES BREVDORT ELECTRI	17606.40	13.78	14400.00	640.00	640.00		640.00	640.00	16960.00
10 SITES BREVDORT ELECTRI	6002.00	15.56	4000.00	200.00	200.00		200.00	200.00	4800.00

EFIN

Appendix D



APPENDIX D

D-1

United States
Department of
Agriculture

Forest
Service

Hiawatha National Forest
Rapid River Ranger District
8181 Highway 2
Rapid River, MI 49878

Reply to: 2620

Mr. Bernie Ylkanen, Fisheries Biologist
Michigan Department of Natural Resources
Regional Headquarters
1990 U. S. 41 South
Marquette, Michigan 49855

Date: February 7, 1985

Dear Bernie:

Enclosed is a copy of the Forest monitoring plan for the Brevoort Lake diversity reef structure.

This plan is prepared primarily to itemize the Forest commitment in terms of program planning and budgeting through the publication stage.

Sincerely,

DeWayne E. Campbell
Fisheries Biologist

Enclosure

cc: John D. Schrouder, Fisheries Biologist, DNR, District 4
District Ranger, USDA-Forest Service, St. Ignace R.D.
Chuck Bassett, USDA-Forest Service, Manistique R.D.
Joel Holtrop, USDA-Forest Service, Rapid River R.D.



BREVOORT LAKE DIVERSITY REEF MONITORING PLAN

Monitoring studies of the Brevoort Lake diversity reef will have the purpose of determining the overall effectiveness of the reef in providing the functions and outputs anticipated in the original plan. Determinations resulting from these studies will be documented for analysis by the Forest Service and published for appraisal and reference of the fisheries profession.

Functional evaluations of effectiveness are categorized broadly as ecological, economic, and structural. Ecologically, a five-year study of fish response to the reef will provide for adequate assessment of the reef's prime value in producing indicator species of fish. Ecological responses in terms of species interactions within the lake would involve a longer period of study. Economically, a lag time exceeding five years for maximum public response to an improved fishery potential would also require a longer period of analysis, although the walleye fishery will be recognized and exploited promptly by many anglers. Structural evaluations within the five year study period should provide basic conclusions as to longevity of the structure.

Ecological determinations of the reef function will include, but not be limited to, the factors of:

A. Fisheries values, encompassing:

1. Quantitative and qualitative aspects of recruitment to fish populations and the lake fishery.
2. Relative value of the reef as a discrete habitat type for fish within the lake basin and developing attraction to varied fish species.
3. Production of invertebrates (gross observations utilizing the crayfish as an indicator species).
4. Macrophyte development in areas sheltered from waves and currents (gross observations of aquatic flowering plant development).
5. Threatened species. The State is considering reestablishment of the lake sturgeon, a threatened species in Michigan, through introductory stocking on the reef. Should this come to pass, the monitoring program will be expanded as necessary to encompass the reef's relationships to this species during the early life history stages. Due to late maturity of the lake sturgeon (21 years or more), further appraisal of the reef/sturgeon relationships could not occur for approximately 25 years.

B. Usefulness to Fish Dependent Wildlife.

The Forest Wildlife Biologist and the St. Ignace District plan to construct experimental avian raptor perches on the reef. This wildlife study will be expanded to determine predicted use of the general reef area by shorebirds and other aquatically (fish) oriented wildlife. Fisheries personnel will contribute observations of this nature made during periods of fishery

investigations, though the fishery studies are not programmed for wildlife evaluations. This plan will be forthcoming.

C. Economic Determinations

Economic determinations will be directed toward the following areas, although primary capability in this monitoring plan is limited to the first two:

1. Changes in creel returns to the anglers.
2. Changing levels of angler use.
3. Impacts on the local economy.
4. Effects and interactions with other National Forest activities in the lake area.

D. Structural Evaluations

Structural monitoring is an engineering function and addresses the continuing integrity of the reef structure over the years as it is potentially impacted by stresses of wave and ice action. Engineering reports or publications may be generated pertaining to this unique structure for the benefit of both fisheries and the engineering professions. A structural monitoring plan will be forthcoming.

Annual Fisheries Evaluations, 1985 through 1989

Annual fisheries investigations will consist of four study periods conducted in early spring (late April-early May), late spring (June), midsummer (July) and fall (1st week of October). Annual progress reports will be prepared to provide communications with the Forest Supervisor and the Forest publics.

Early Spring Studies

The early spring survey will be scheduled to coincide with the spring breakup of ice on the lake and will extend through the full spawning activity period of the walleye. This study will utilize trap nets and fyke nets. Electrofishing may be employed on occasion at the discretion of the biologist. The need is not foreseen. A minimum of 12 nets and 120 net nights of effort will be required to accomplish this work.

This survey will evaluate spawning fish populations in the lake at large with central focus on fish activities on the reef. Comparisons between fish responses to the reef and responses to other favored spawning sites will be particularly sought. Comparison sites will include Massey Bay and its associated north/south shorelines on the east end of the lake, the Little Brevoort River area in Boedne Bay and the Cut River area. These are the only alternate areas displaying walleye activities in the lake at large.

Capture, mark and recapture techniques will be employed to estimate discrete population sizes. Dart tagging may be employed to identify indiscriminate fish movements or loyalty to particular spawning areas. (Dart tagging may also be employed to determine harvest rates). Fish of pertinent interest will be scale sampled and ages will be determined. Data will be recorded for such information as sex ratios, species composition, length/weight relationships, sexual maturity, degree of ripeness, disease, and other factors common to such studies. The standard data forms to be employed adequately checklist these and other basic fishery information requirements of the survey. (Typical study forms are appended).

The early spring survey will continue until adequate spawning population data are collected for analysis and will continue with periodic observation of the reef until the eggs attain the fry stage. Continuing quantitative analysis of fry production will involve selection and development of sampling techniques best suited to statistical estimates of fry surviving the egg stage.

During this period, water quality will be analyzed to determine initial chemical baseline conditions, abrupt changes in which may affect egg and fry survival during incubation on the reef. The study will examine the possible influences of leaching from newly placed dolomitic limestones and the diurnal changes in pH, oxygen, CO₂, and alkalinity due to photosynthetic activity of periphyton. Permanent sampling stations will be established on and about the reef. A chemical monitoring plan will be forthcoming.

Late Spring Studies (Water 60°F+)

This assessment is scheduled to coincide with maximum spawning activity of Centrarchid fishes, particularly, smallmouth bass - a target species. Precise scheduling is dependent on water temperatures (approaching 60°F) which initiate reproductive activities. Efforts will center on appraising the spawning activities of Centrarchids on the reef with gross estimates of nesting. As with the early spring survey, the study will attempt the comparison of reef spawning activity with activity at other spawning sites in the lake. Water chemistry will again be analyzed for changes in chemical conditions in close juxtaposition with the reef. Permanent sampling stations will have been established for this purpose during the earlier survey.

Midsummer Studies

The midsummer survey will be scheduled during the third week of July and will evaluate the use of the reef by all fish species as a habitat attraction and will document key population components, particularly, young-of-the-year basses resulting from spawning activity (schooled populations). This effort will primarily involve electrofishing and night observations with lights. A limited number of trap nets may be employed. Snorkling with a face mask will be employed for nest identification and counting. SCUBA diver volunteers may also be available to assist in this study. Underwater photography will aid in documentation of habitat character.

Water chemistry will not be essential at this time.

During this period observations will also be made of the reef's physical condition, periphyton, macrophyte development and invertebrate production over the reef surface. Physical changes in the reef due to ice or wave action will be documented for review by Forest engineers, though such observations will not substitute for evaluation by engineering staff.

Fall Investigations

Fall studies will be conducted during the first week of October. This standard scheduling date is essential to collection of fishery data having relatively constant ecological parameters. Work will be primarily with electrofishing gear, but accomplishment is weather dependent. Four to five nights will be adequate with favorable conditions for shocking. Emphasis in this study will be on assessing the survival of reef spawned, young-of-the-year fish, particularly, walleye, smallmouth bass and cisco.

Time Requirements for Forest Personnel in the Annual Monitoring Program for the Brevoort Reef

The following time frames for Forest personnel involvement are minimal. It is important that the fisheries biologist has adequate freedom to concentrate on the study and analysis of reef functioning, equal to that which would be available to a contracted research agent (the alternative to in-house evaluation by the Forest).

Early Spring Evaluation (Approximately two weeks in mid-April to early May)

Spawning Populations, Field	<u>Not less than</u>	<u>Estimated Costs</u>
Fisheries Biologist	10 Days	\$1050
Fisheries Technician	10 Days	809
Assistant (District Volunteer)	10 Days	NC
Vehicle (Mileage + FOR)		171
Per Diem Expense (2)	9 Days	<u>900</u>
		\$2900
 Fry Emergence, Field		
Fisheries Biologist	10 Days	1050
Fisheries Technician	5 Days	405
Assistance (District Volunteer)	10 Days	NC
Vehicle (Mileage + FOR)	-	171
Per Diem Expense	13 Days	<u>650</u>
		\$2276
 Laboratory/Office/Maintenance		
Fisheries Biologist	10 Days	\$1050
Fisheries Technician	10 Days	809
Equipment Maintenance		<u>50</u>
		\$1909

Late Spring Evaluation (Approximately 1-1/2 weeks in mid-June)

Spawning Populations, Field

Fisheries Biologist	7 Days	\$ 735
Fisheries Technician	7 Days	566
Assistant (District Volunteer)	7 Days	NC
Vehicle (Mileage + FOR)	-	112
Per Diem Expense (2)	12 Days	<u>600</u>
		\$2313

Laboratory/Office/Maintenance

Fisheries Biologist	10 Days	1050
Fisheries Technician	7 Days	566
Equipment Maintenance		<u>50</u>
		\$1666

Mid-Summer Evaluation (Approximately 5 days, 3 week of July)

Population & Reef Analysis - Field

Fisheries Biologist	7 Days	735
Fisheries Technician	5 Days	405
Vehicle (Mileage + FOR)	-	112
Per Diem	10	<u>500</u>
		\$1752

Laboratory/Office/Maintenance

Fisheries Biologist	5 Days	525
Fisheries Technician	5 Days	405
Equipment Maintenance		<u>100</u>
		\$1030

Fall Survey (First Week in October)

Fingerling Survival Studies - Field

Fisheries Biologist	7 Days	735
Fisheries Technician	7 Days	566
Assistant (District Volunteer)	5 Days	NC
Vehicle (Mileage + FOR)	-	112
Per Diem (2)	12 Days	<u>600</u>
		\$2013

Lab/Office/Maintenance and Annual Report

Fisheries Biologist	10 Days	1050
Fisheries Technician	5 Days	405
Equipment Maintenance	-	<u>100</u>
		\$1555

TOTAL		\$17,114
-------	--	----------

Economic Evaluations

1. A creel census clerk will be employed by the MDNR through the St. Ignace office of the MESC to conduct field interviews of anglers on the lake. Cost is estimated to be \$52.50 per day, including vehicle mileage, for 133 days (\$6983).

Interviews will be conducted as follows:

12/23/84 through 4/11/85, three days per week (48 days)
 4/12/85 through 5/14/85, two days per week (10 days)
 5/15/85 through 6/30/85, four days per week (28 days)
 7/1/85 through 9/30/85, three days per week (39 days)

2. Using the form (attached), the clerk will conduct interviews and make total angler counts at regular intervals.
3. The DNR will keypunch and statistically analyze these data and provide a summary report of catch rates by month and season for creel fish species. Total angler trips and hours fished per month will be compiled for types of angling, as boat, shore, or ice fishing (shanty and open ice).
4. Creel fish will be analyzed for length, weight, age and growth (scale samples). Estimates will be provided of total pounds of fish caught.
5. Ted Beavais (St. Ignace) will develop a structured analysis for a sub sample of interviewed anglers. The purpose will be to develop other pertinent information relating to length of stay, residence while fishing, demographic characteristics and angler attitudes.
6. Analysis of both data sets will attempt to better define economic impacts of the reef.
7. The Forest will supplement angler use evaluation studies by overflying the lake three times monthly during fire detection seasons and making angler boat counts simultaneously with those of the creel census clerk.

To determine angler trends which may develop, commensurate with the five year monitoring report, this creel census will be repeated in the third and fifth years of the study program. \$10,000 should be planned for each of these subsequent use studies.

The following is a specific schedule of creel census activities:

BREVOORT LAKE CENSUS SCHEDULES

<u>Census Period</u>	<u>Days Censused/Wk</u>	<u>Shifts</u>			
		AM=I		PM=II	
Dec. 12, 1984 - April 11, 1985	3	7 am - 3:30 pm	10:30 am - 7 p		
April 12, 1985 - May 14, 1985	2	7 am - 3:30 am	10:30 am - 7 p		
May 15, 1985 - June 20, 1985	4	6 am - 2:30 pm	12:30 pm - 9 p		
July 1, 1985 - September 30, 1985	3	6 am - 2:30 pm	1:30 pm - 10		

<u>Date</u>	<u>Shift</u>	<u>Count Times</u>	<u>Date</u>	<u>Shift</u>	<u>Count Times</u>	<u>Date</u>	<u>Shift</u>	<u>Count Times</u>
Dec. 12	I	7A, 9A	Jan. 22			March 1		
13	II	4P, 6P	23	I	8A, 10A	2	I	10A, 12
14			24			3	II	4P, 6
15	II	3P, 5P	25			4		
16	I	10A, 12N	26	II	2P, 4P	5		
17			27	I	9A, 11A	6	I	8A, 1
18			28			7		
19			29			8		
20			30			9	II	IP, 8A, 1
21	II	3P, 5P	31	II	3P, 5P	10	I	
22	II	4P, 6P				11		
23	I	9A, 11A	Feb. 1			12		
24			2	I	8A, 10A	13		
25			3	II	1P, 3P	14	II	IP,
26	II	4P, 6P	4			15		
27	I	8A, 10A	5			16	I	8A, 1
28			6			17	II	3P,
29			7			18		
30	II	1P, 3P	8	I	9A, 11A	19	I	8A, 1
31			9	II	4P, 6P	20		
			10	I	9A, 11A	21		
			11			22		
Jan 1			12			23	II	4P, 6
2	I	10A, 12N	13	II	4P, 6P	24	I	8A, 1
3			14			25		
4			15			26		
5	I	8A, 10A	16	I	8A, 10A	27		
6	II	2P, 4P	17	II	3P, 5P	28		
7	I	8A, 10A	18			29	I	9A, 1
8			19	I	10A, 12N	30	I	8A, 1
9			20			31	II	2P,
10			21					
11			22					
12	II	4P, 6P	23	II	2P, 4P			
13	I	8A, 10A	24	I	8A, 10A			
14			25	II	3P, 5P			
15	II	IP, 3P	26					
16			27					
17			28					
18								
19	I	10A, 12N						
20	II	3P, 5P						
21								

Date	Shift	Count Times	Date	Shift	Count Times	Date	Shift	Count Times
April 1			May 1			June 1	I	7A,9A
2	I	10A,12N	2			2	II	2P,4P
3			3	II	IP,3P	3		
4			4	I	9A,11A	4	I	6A,8A
5			5			5		
6	I	7A,9A	6			6		
7	II	3P,5P	7			7	II	IP,3P
8			8			8	II	3P,5P
9			9	II	4P,6P	9	I	8A,10A
10			10			10		
11	II	2P, 5P	11			11		
12			12	II	2P,4P	12	I	9A,11A
13	II	3P,6P	13			13		
14			14	II	2P,4P	14	II	5P,7P
15			15	I	7A,9A	15	I	6A,8A
16			16			16	II	2P,4P
17	I	7A,9A	17			17		
18			18	I	6A,8A	18		
19			19	II	1P,3P	19	II	IP,3P
20	II	3P,5P	20	II	5P,7P	20	I	8A,10A
21			21			21		
22	II	4P,6P	22			22	II	3P,5P
23			23			23	I	6A,8A
24			24			24	I	11A,1P
25			25	I	8A,10A	25		
26			26	II	4P,6P	26		
27			27	I	6A,8A	27	II	3P,5P
28	I	8A,10A	28			28		
29			29	I	10A,12N	29	I	8A,10A
30			30	II	4P,6P	30	II	IP,3P
			31					

Date	Shift	Count Times	Date	Shift	Count Times	Date	Shift	Count Times
July 1	II	4P,6P	Aug. 1	I		Sept. 1		
2			2			2	II	6P,8P
3			3	II	1P,3P	3		
4	I	8A,10A	4	I	8A,10A	4	I	8A,10A
5			5			5		
6	I	6A,8A	6			6		
7			7			7	I	10A,12N
8			8	II	2P,4P	8		
9	I	6A,8A	9	II	6P,8P	9	I	7A,9A
10			10			10		
11			11	II	7P,9P	11		
12	II	2P,4P	12			12	II	2P,4P
13	II	7P,9P	13	I	7A,9A	13		
14	I	8A,10A	14			14	II	1P,3P
15	II	4P,6P	15			15	I	6A,8A
16			16			16		
17	I	6A,8A	17	I	6A,8A	17		
18			18	II	4P,6P	18	II	5P,7P
19			19			19		
20			20			20		
21	I	7A,9A	21	II	3P,5P	21	II	3P,5P
22			22			22		
23	I	8A,10A	23	I	6A,8A	23		
24			24			24	I	6A,8A
25			25	I	10A,12N	25		
26	II	5P,7P	26	II	7P,9P	26	II	6P,8P
27			27			27		
28	II	7P,9P	28			28	I	8A,10A
29			29			29	II	4P,6P
30			30			30	I	8A,10A
31	I	10A,12N	31	I	7A,9A			

Studies Beyond the Five Year Period

Impacts of the diversity reef on the Brevoort Lake fishery will be appraised over a twenty year period.

Fishery analysis of the reef should continue in the latter half of the initial decade with surveys being conducted biennially from 1989 through 1994. The following decade should see at least two evaluations of its continuing effectiveness.

Engineering surveillance of the structure on a continuing basis through the two decades will be essential for appraisal of the design and to identify maintenance needs.

It is specifically recommended that the creel census be reinitiated at least twice during the second five year period to quantify reef production to the anglers. These studies should also be expanded in the attempt to identify economic benefits to the public and to appraise the interrelated impacts of the project on other Forest activities.

Communications

This is a significant fisheries enterprise. Within the fisheries profession the Brevoort Reef's scope and purpose are unique. Artificial reefs are being constructed internationally in a great many designs and of varied materials. But the common factor of purpose in current efforts is the attraction of fish for harvest, rather than the production of fish population recruitment and greater biomass. Also the emphasis in such structures is almost entirely in the marine environment. It is critical that all factors regarding the reef's construction and functions be well documented for the reference of others having similar needs or interests.

Annual progress reports will be provided to the Forest Supervisor for his use and through his office to inform the Forest Service and its publics. A complete evaluation report will be provided to the Forest Supervisor following the fifth year of analysis after final construction (1989). This publication will be presented to the American Fisheries Society and will be presented also to a professional symposium relating specifically to artificial reef structures.

To accommodate these needs, it is important to assure maximum (priority) involvement of the S.O. specialist illustrator. A minimum of five days annually will be programmed for the illustrator to acquire a full series of events and activities. In the fifth year (1989) at least ten (10) days will be required of the specialist to assist with charts, illustrations and photos for the publication and visual aids for its formal presentation.

Additional funds (indeterminate as yet) will be required for printing and distribution of the F.S. publication. Technical reprints would be available from the American Fisheries Society of academic treatise.

DeWayne E. Campbell

12/20/84

Appendix E

Appendix E

Cross-Country Club Organizes

A cross-country ski club has been formed in the St. Ignace area, organized under the Silver Mountain Ski Association. The club will plan and develop cross-country ski trails and related facilities and hopes to coordinate trail networks with other areas.

The new club hopes to be able to add to the existing cross-country trail network already started at Silver Mountain and to begin trail cutting at a proposed ski area near the Brevort sand dunes, currently being designed by the U.S. Forest Service. Plans are also underway to cut a ski trail from Silver Mountain to St. Ignace, about a six-mile run.

The Cross-Country Ski Club will apply, through the Mackinac County Economic Development Corporation, for funds to assist in the construction of the facilities next summer. The group will also seek funds from area organizations, to assist with the construction programs.

Another project will be to identify and make contact with other cross-country ski clubs or interested skiers in the area to begin long-range planning for development of the Eastern Upper Peninsula as a cross-country ski resort.

An excursion to the Valley Spur ski area near Munising is planned for this Saturday, February 8, so that members can see firsthand a model development of cross-country trails. Interested persons will meet at the St. Ignace District Office of the U.S. Forest Service, West US-2, at 8 a.m. and participants will carpool to Munising.

A club meeting has been scheduled for 5 p.m. on Thursday, February 14, at the Zion Lutheran Church.

Both the meeting and excursion to Valley Spur are open to anyone interested in the club. More information can be obtained from club chairperson, Carol Jenkins, at the Mackinac County EDC office.

St. Ignace Cross-Country Club Plans New Trails for '86 Season

Three new cross-country ski trails are planned for next winter in the St. Ignace area. The new trails will total nearly 17 miles of groomed skiing and are an initial effort by area enthusiasts to provide top-notch cross-country ski facilities in the Eastern Upper Peninsula.

The Silver Mountain Ski Association will add about five miles of new trail to the existing network of loops surrounding the downhill skiing at Silver Mountain. A connecting trail leading from St. Ignace to Silver Mountain (five to six miles) is also being planned and a new loop system being mapped by the Hiawatha National Forest at the Brevort Lake sand dunes will provide nearly seven miles of new trails.

The Cross-Country Ski Club, a branch of the Silver Mountain Ski Association, hopes to construct the trails at the sand dunes and the trail bridging St. Ignace to Silver Mountain. The club, with assistance from the Mackinac County Economic Development Corporation and the E.U.P. Regional Planning and Development Commission, will apply for a youth employment grant that could provide up to 20 workers for 10 weeks to construct the trails.

At the club's meeting last Thursday, February 14, St. Ignace Community Education Director Joe McLafferty said he would seek two interns through his program to supervise two work crews of youth on the trails.

The club will need to raise money, however, for heavy equipment needed in construction of the trails.

Kurt Voelkner, a seasonal employee with the U.S. Forest Service and a cross-country ski enthusiast, has completed initial mapping of a 1.8 mile beginner loop, a 3.2 intermediate loop, and a 1.75 mile expert loop on Forest Service property near Brevort Lake Road. Voelkner, who has donated his time to plan the trail system, will spend much of the rest of this winter flagging the trail for the work crews next summer.

The sand dune trail system will begin at the old Civilian Conservation Corps (CCC) camp at the corner of West US-2 and Brevort Lake Road and run back

through the dunes and forests.

Other members of the club are beginning to map a trail from Silver Mountain to the city somewhere along the Cheeseman Road route. That trail will require permission to cross some private land.

In the meantime, the Silver Mountain Ski Association is forging ahead with plans to add to the existing trail system at Silver Mountain.

The association may also begin construction of a new chalet east of the existing warming hut which will serve cross-country and downhill skiers. The entire ski hill will be moved in several years to accommodate the proposed widening of West US-2. If the new chalet is built before the hill is moved, however, it will serve primarily cross-country skiers.

Club member Jim Drazie is preparing a slide presentation of existing cross-country ski trails in St. Ignace to show area service clubs, hoping they may help fund heavy equipment ~~use on~~ the trails. Planners hope to get a good estimate of that cost when the snow melts in the spring.

Regional planner and club member Roger Pilon is continuing to identify cross-country ski clubs or other organizations interested in establishing ski trails in other areas of the Eastern Upper Peninsula. A coordinated effort at trail development with linking trails and dining and lodging facilities will be the next step in providing a winter mecca for cross-country skiers.

The Cross-Country Ski Club will meet next on February 28 at 5 p.m. at the Zion Lutheran Church. The club plans a family outing at Silver Mountain the weekend of March 9-10 to acquaint skiers with the facilities there and to attract members to the club, which formed only this month.

Ten members of the club spent last Saturday posting the cross-country ski trails at Silver Mountain with signs asking snowmobiles to keep off the groomed trails.

Area skiers interested in club activities can contact Carol Jenkins at the Mackinac County EDC or Ranger Ted Beauveaus at the St. Ignace office of the Hiawatha National Forest.

Fish Producing Reef, Almost Finished, Is Seen Boosting Brevort Lake's Economy

By Wesley P. Manver

The Brevort Lake reef being constructed to increase production of walleye fish and other species is continuing during winter days as huge trucks dump what will amount to a total of 26,000 tons of stones along a 10-foot wide, 2,100-foot long strip weaving into the lake at a depth of five feet.

The Forest Service expects the reef to be complete within weeks, and when set to the performance planned for it promises to boost the Brevort Lake economy, will attract more fishermen to the area, and will improve the economy of the surrounding area.

Backhoes are breaking and heaving the ice as the trucks move in to dump their loads of stone in the 4,230-acre lake which moves into the lake at as even 5-foot depths.

Some of the trucks carry as much as 25 tons of stone and pebbles gathered from the Rexton's state gravel pit. The \$20,000 cost of the stone carried to the reef is part of the Department of Natural Resources contribution to the \$350,000 federal project.

The lake is five miles long and, at places, two miles wide, and is shallow, moving from the shore to spots in the lake no deeper than 25 feet. The reef construction and its function is created, tested, and installed in other lakes in the Upper Peninsula, and under the direction of the U.S. Forest Service by authority of the Sales Act. Fifty-three percent of Brevort Lake's shoreline is in the Hiawatha Forest, on land the federal government owns. The Forest Service has a campground and a recreation complex on Boedne Bay and has maintained a summer home group at Black Point, the site of the reef.

On private land, the lake has 10 resorts around it with daily cabin capacity of 320 persons, and a camping capacity of 70 persons. Most of the private services are along the eastern shoreline. Three of the resorts have boat launching facilities.

Three U.S. Forest Service officials discussed the continuing project with the St. Ignace News and explained plans for additional features relating to wildlife. Steve Anderson, district ranger of the St. Ignace Ranger District of the Hiawatha Forest with offices five miles west of St. Ignace on US-2, Theodore W. Beauvais, acting district ranger, and DeWayne E. Campbell, fisheries biologist, of the Hiawatha National Forest, Rapid River Ranger District, told us they are considering putting up three raptor perch trees on the reef. These would be standing dead trees extending about 30 feet above the reef. These would be standing dead trees to allow osprey and bald eagles to roost and fish on the reef, and possibly even nest in the trees.

They listed some of the benefits of the perch trees. The trees would be visible to boaters and snowmobilers and serve as safety alerts, and at the same time would serve two magnificent birds of prey classified as sensitive (osprey) and threatened (bald eagle) in Michigan.

As for the disadvantages, they think the trees might jar the aesthetic

sensitivity of some people, and the birds' consumption of fish, while amounting to relatively small amounts for food intake, might worry some people. The foresters point out, however, that walleye spawn during about a three-week period in shallow water at night.

The biologist describes Brevort Lake as a water desert, referring to the fact that the lake has virtually an all sand bottom, blown by winds sweeping the sand dunes nearby. The wind stirring huge waves, shifts the sand at the bottom of the lake and makes it practically unstable for spawning or for aquatic plants. For that reason the population of some fish has in the past been maintained by stocking. By providing a more stable environment for spawning, such as pebbles and stone afford, the population of certain fish species increase, providing enough fish for fishermen, for bird food, and at the same time the system will serve as self-sustaining, accommodating adequately recreational fishing.

Fish eggs spawned in the crevices of pebbles and stones protect them from an unstable, shifting bottom, also from predators, and provides conditions whereby more fish are hatched. Walleye and muskellunge are favorites of many fishermen, and the reef thus serves the increase of fishermen coming to the lake. Other species and fish foods find the new environment good.

Brevort Lake ranks No. 6 in total angling effort among major Upper Peninsula lakes. In 1980, according to DNR creel and census data, 25,000 angler days were expended at Brevort

Lake, and its total economic value was estimated at \$625,000. The species caught by anglers besides walleye and muskellunge are recorded as northern pike, sunfish, yellow perch, black crappie, and large and small mouth bass.

Fishermen have complained in recent years that fishing on Brevort Lake is deteriorating. And the Forest Service rangers, federal and state fisheries biologists, and the DNR district men have been listening to the complaints and have checked. In 1961 and 1969 a pike spawning marsh was developed in response, but it has since been discontinued. Stocking of walleye and muskellunge fingerlings was introduced in Brevort Lake in 1978, and anglers began catching legal size walleye in 1981. But the population of this species, fisheries biologists have ascertained, is still too low.

The reason for the low fish production has been traced by fisheries biologists. Brevort Lake is in the area of sand dunes and the wind moves the sand outward and eastward and impacts much of the shore area, they report. Sand bottom is neither productive of fish food organisms as it is non-productive of fish, and a fish study made from 1976 to 1981 concluded that Brevort Lake has potential to produce many more pounds of fish than is produced now. So it was suggested ten years ago that the first order of things was to construct a rock reef along the north shore to create spawning habitat for walleye and other game and forage fish, because these species utilize rock substrates, to which small

mouth bass (a good game fish), rock bass, cisco, and potentially, lake sturgeon respond. And complementing this, fish food organisms, such as crayfish, mayflies, and caddisflies are increased. And the reef is so located as to protect it from the full force of winds. The bottom sediments are thus stabilized allowing aquatic plants to take hold. This provides the habitat for fish and for fish food organisms.

The forest service men who evaluated the proposal to build a reef at Brevort Lake to provide a more productive fishery are convinced that the entire economic, social, and biological environment in or around Brevort Lake will be affected by the reef's performance. The modification of the lake bottom contours and bottom materials will produce changes at all levels of the aquatic food web from algae to plankton, through predatory fishes and fish dependent on wildlife, states their report, and it adds that the impacts will affect sport fishermen as well as local recreation dependent economy supplying goods and services.

Lakeshore residents and nonfishing recreationalists, states the report in its conclusion, will all be affected. That is why the fisheries biologists and the forest service personnel are excited about the reef's wide boost. They are eager, even anxious, that the public understand the reef's wide biological and environmental import so that the public can join them in their sanguine expectations.



DeWayne E. Campbell, fisheries biologist with the United States Forest Service at Rapid River Ranger District, Theodore W. Beauvais, acting district ranger (standing), and Steve Anderson, district ranger of the St. Ignace Ranger District (far right), in charge of the Brevort Lake \$350,000 reef federal project which is expected to produce more game fish, boost the Brevort Lake economy, and improve the economy of surrounding area.

SKI TRAIL PLANS UNDERWAY ON ST. IGNACE DISTRICT

Work has begun on the location of a cross-country ski trail system on the St. Ignace Ranger District. Working under the supervision of Assistant District Ranger, Ted Beauvais, Kurt Long Voelkner, an E.C.&M. Civil Engineering Technician, has been volunteering his time preparing an Environmental Assessment of the project and laying out a ribbon line designating the proposed trail network locations. Once a ribboned location has been laid out a field review by the District and S.O. Staff specialists is planned. Since the area falls within the state coastal management zone their concurrence will be sought. Actual construction of the trails may take place as early as this summer for possible use by the U.P. Winter Olympics next winter.

The finished trail system will be located in the Lake Michigan Sand Dunes area which lies north of U.S. Highway 2 and west of Forest Highway 57 (Brevoort Lake Road). It will be a nested-loop type of trail system with approximately 12 kilometers (7.5 miles) of trails designed for beginners, intermediate, and eventually expert degrees of difficulty. The trails will wind through a variety of terrain and forest types, giving skiers an opportunity to see some of the different forest components and, at the same time, maintain a high level of interest.

Cooperating with the Forest Service on this project has been the newly formed Silver Mountain Cross-Country Ski Club of the St. Ignace area. Its members offer a wide variety of expertise as they include members of city, county, and regional governments and planning commissions, the Forest Service (Ted Beauvais - Steering Committee Member, Forester Ann Long Voelkner, and Kurt Long Voelkner), local state police officers, a local pastor, a motel owner, the co-editor of the local newspaper, the Community Education Director, and local skiers. Cooperation with this group gives the Forest Service the opportunity to develop better rapport with the public and maintain and improve good public relations, while at the same time answering the public's expressed need for increased non-motorized winter recreational opportunities in the form of cross-country skiing.

This club is already working on finding supervisors for 1-2 summer youth employment training program work crews to begin trail construction this summer at the Lake Michigan Sand Dunes and to work on the expansion of existing cross-country ski trails at Silver Mountain Ski Area in St. Ignace. Using this resource to construct trail, along with weekend volunteer work groups if needed, will keep trail construction costs at a bare minimum, provide summer employment for 10-20 youth, and will very likely see the trail system completed in time for next year's ski season. Other cost cutting measures will include the possible use of the existing Forest Service Visitor Information Center along U.S. 2 as a parking area for the trailhead, thereby negating the need for construction of a new facility and its added costs, possible donation of equipment time from a local construction company, and working on a cooperative agreement with the cross-country ski club to groom and maintain the trails, once completed.

A club sponsored trip to the Valley Spur Ski Area on the Munising District, February 9th, provided some club members with the opportunity to experience a high quality, well-designed, cross country ski trail system. Special thanks to Munising District's Dave Worel for his time and advice on design aspects and Ted Beauvais for providing transportation.

This is a very exciting time for the Forest Service and the St. Ignace area in terms of cross-country skiing. Hopefully we'll see you out on the ski trails next ski season.

Submitted by Kurt Long Voelkner



100 Marley,
County Court House
St. Ignace, MI 49781
906-643-7340

MACKINAC COUNTY
ECONOMIC DEVELOPMENT CORPORATION

Gary L. Reid - Director

January 29, 1985

Mr. Ted Beauvais
U. S. Forest Service
West U. S. 2 Hwy.
St. Ignace, MI 49781

Dear Ted:

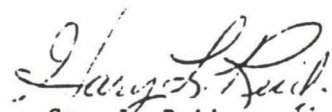
We have been aware that the U. S. Forest Service have plans for trails and are happy to learn the planning stages are progressing to see additional activities, such as cross-Country skiing. I have previously expressed support on the trail system to Steve Anderson and would reiterate that the EDC will be willing to do anything we can to assist in the plans.

We see this project as highlighting to serve the area by helping promote directly the Travel and Recreation Industry and also allowing an extension of the season.

Outdoor winter sports activities are on the increase and we see it as a very important addition to our infrastructure and the business environment during the months following. We urge you to take whatever steps or action to bring this project on line as quickly as possible.

Thank you for your cooperation in this matter.

Sincerely,


Gary L. Reid
Director

GLR:cj



United States
Department of
Agriculture

Forest
Service

Star Rte. #2, Box 101, St. Ignace, MI 49781

Reply to: 1620

Date: August 9, 1984

r

L

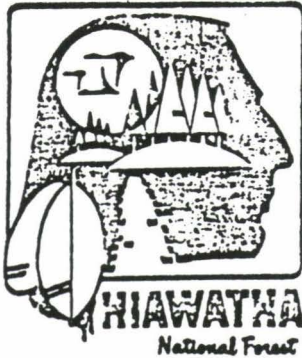
You are invited to attend the first annual open house of the St. Ignace Ranger District and the Eastern Zone Construction and Maintenance Unit, Hiawatha National Forest, at our office on West U.S. 2 at West Moran Bay. My staff and the Engineering Unit will be available on August 29, 1984 from 3:00 P.M. to 8:00 P.M. to explain what we are contemplating in the next year and to answer your questions and concerns.

Topics we plan to cover are upcoming timber sales, free firewood, firewood for sale, campground repair work, the Brevoort Lake Reef, National Forest land management planning, RARE II and wilderness, a cross-country ski trail, wildlife habitat management, road construction, and land surveying.

We hope to see you and hear your views.

STEVEN C. ANDERSON
St. Ignace District Ranger





news release from the hiawatha national forest

E-8

Forest Supervisor
Hiawatha National Forest
P.O. Box 316
Escanaba, MI 49829
Phone: (906) 786-4062

Contact:

STEVEN C. ANDERSON
District Ranger
August 7, 1984

Press Release

Want to know what is happening on the Hiawatha National Forest, right in your own backyard?

Find out at the open house scheduled on August 29 at the St. Ignace Ranger District office on West U.S. 2 near Gros Cap cemetery. The open house is designed to outline the St. Ignace District's work plans and upcoming projects in 1984-85 and to provide the public with a forum to raise topics and concerns about what is happening on the National Forest. The office will be open until 8:00 that evening, so drop by at your convenience.

Among the subjects that will be formally presented include: the change in emphasis from free use firewood permits to charge system for firewood permits. The planned improvement in fish habitat on various streams in the area, the Brevoort Fish Spawning Reef, location and development of a cross country ski trail in the area, Forest land management planning, road construction projects including the reconstruction of the Castle Rock Road, several timber sales in the area, some wildlife habitat improvement projects and potential wilderness opportunities in the area.

The open house is available to anyone interested in activities involving the management and operations of the National Forest lands in the area. For more information about the open house, contact Steve Anderson at the District office in St. Ignace or call 643-7900.



HIAWATHA LAND

ITS PEOPLE

ITS RESOURCES

NOVEMBER, 1984

St. Ignace Open House Draws Interest

A total of 164 persons visited the St. Ignace office during a joint open house hosted Aug. 29 by the St. Ignace District and Eastern C&M Unit.

Employees were on duty until the office closed at 8 p.m. and were kept busy answering questions and greeting visitors.

Notification of the open house was made through local media, including the cable television's community access channel, and by an invitation letter sent to persons on the district's mailing list.

Range Steve Anderson was presented a certificate of appreciation from Lt. Robert Stewart of the Michigan State Police Post for district and unit cooperation over the years in search and rescue operations.

Visitors were able to view the Forest's traveling fair display as well as slide presentations on the Brevoort Lake Reef, Youth Conservation Corps projects and loons.

Rob Clark displayed locations of upcoming timber sales, and Ted Beauvais exhibited information on the proposed Sand Dunes cross-country ski trail.

Fisheries and wildlife project locations also were displayed. Mike Lange set up electronic distance measuring equipment for visitors to view.

Most visitors appeared pleasantly surprised at the breadth of programs, knowledge and expertise represented; it seems few had been acquainted with the full range of Forest Service activities.

Many visitors stayed at the office one to two hours, viewing slide presentations, talking with personnel, and touring the district office.

Some issues and interests which surfaced were:

- Interest in improving brook trout populations and fishing success.

- Interest in excluding salmon from tributaries of the Carp River and Silver Creek.

- Interest in winter access to



Jim Evers talks with a visitor during the St. Ignace District and East C&M open house.

Boedne Bay area on Brevoort Lake. (District will ask the county to plow the road to the Boedne Bay YCC camp).

- Interest in more winter cutting in deeryards.

- Interest from five timber operators who attended in availability of more timber, particularly aspen and cedar.

- Brevoort Lake summer home permittees reminded district personnel of their commitment not to develop a boat ramp at the reef access road.

- Concern over shoreline algae growth and resulting odor on Brevoort Lake; removal of reef causeway after work is completed this winter is expected to resolve the problem.

- Need for better signing on I-75 to guide visitors to the Carp River boat launch and Foley Creek and Carp River campgrounds.

- Indications of development of local interest in a cross-country ski trail.

- Request from hunters for a grouse management area; fits well with developing Forest Plan and a planned FY 86 timber sale of 10-acre aspen blocks.

- Concern that firewood be made available as close to town as possible.

- Interest in wild rice planting and waterfowl impoundments.

All in all, it was a busy and enjoyable visit with our interested publics. We received many compliments on the office in general and the front reception area in particular.

We plan to make this an annual event.

TED BEAUVAIS
St. Ignace District

Donors Top United Way Goal

Twenty-eight employees from the SO and West C&M contributed to the 1984 Delta County United Way fund drive, exceeding the \$400 goal set for the campaign.

Contributions of \$487 were made between Sept. 12 and Oct. 29 as the units' share of the county's

\$144,000 goal for 1984.

All who contributed - be it volunteer services, cash donations, etc. - are commended for a job well done.

MARILYN JOHNSON
SO

Straits Area Sportsmen's Club ^{E-10}



St. Ignace, Michigan 49781



LAKE TROUT

Aug. 19

Dear Steve Anderson:

The Straits Area Sportsmen's Club would like to ask the U.S. Forest Service if you could look into the possibility of a boat launching area somewhere on Brivot Lake near the East end.

Maybe near the new spawning reef. The Club feels that with the better walleye fishing that is sure to come, we really need better boat launching access.

Thank you very much.

Mark Eby, Secretary

Straits Area Sportsmen's Club^{E-11}



St. Ignace, Michigan 49781



LAKE TROUT

Dear Mr. Steve Anderson:

Aug. 19

The Club would like to ask if there is any way of looking into the possibility of a public access site near Schaeffer Pt. in the west end of Brevort Lake. We have been told that there is some U.S. F. S. land near the point and people that live near that end of the lake, but not actually on the lake, would like more public access.

Please contact me or someone with the Club on any questions you might have. We have just been recently asked on this matter ourselves.

Thank you very much,
Mark Elf

Star Rte. #2, Box 101, St. Ignace, MI 49781

2620

March 19, 1985

Robert Therrian
121 Fitch Street
St. Ignace, MI 49781

Dear Mr. Therrian:

Thank you for sending us your comments concerning the Brevoort Lake Walleye spawning reef. As you may have read in the March 14, 1985, edition of the St. Ignace News, the Forest Service has no plans to construct a boat ramp at the reef site.

We also agree with you when you say that there are other areas on the north side of the lake which might be suitable for construction of a boat ramp.

At this time we are hoping to cooperate with the Waterways Division of the Michigan Department of Natural Resources to build a boat ramp. The location has not been agreed upon as yet, but we will be soliciting public input before any plans are finalized.

Please feel free to contact us again on any concerns in the future.

Sincerely,

STEVEN C. ANDERSON
District Ranger

Robert Therrian
121 Fitch Street
St. Ignace, Mich. 49781

U. S. Forest Service
Star Pte. #2 Box 101
St. Ignace, Mich. 49781
Attn. District Ranger
Steve Anderson

Dear Mr. Anderson

The plan to set raptor trees on the reef is an excellent one. The more wildlife can benefit from Forest Service projects, the more the residents and visitors to the lake will benefit.

As to the development of a boat ramp near the reef, I would have to question that! It seems the increased activity that would cause, would be detrimental to the reasoning behind the construction of the reef. There must be other areas on the north side of the lake to develop a boat ramp. I do feel that access to the reef for the 12 to 16 foot fishing boats popular in this area could be made a little easier.

I appreciate the informative letter and would like to hear of any further meetings between the Forest Service and area residents.

Sincerely;

Robert Therrian



Star Rte. #2, Box 101, St. Ignace, MI 49781

1620

January 8, 1985

Mark Eby
Secretary
Straits Area Sportsmen's Club
St. Ignace, MI 49781

Dear Mark,

As you may know, Mackinac County, under a cooperative agreement with the Hiawatha National Forest, has agreed to plow the Forest Service access road to the YCC Camp and Boedne Bay this winter. This is road #3453 which runs south from the Worth Road near Borland's T.P. restaurant. Although it will be low priority for plowing we hope it will serve the need for winter public access.

Your club has also requested that the Forest Service look into building a new boat launch on the east end of Brevoort Lake. As part of a training course in recreation management I am currently evaluating public access needs on the lake and will be making recommendations in a report due by May, 1985.

I want to consider a broad range of alternatives and look at the roles of the private sector, local, state and federal governments. As you are well aware most of the eastern shore of Brevoort Lake is privately owned. If the Forest Service were to construct a new boat launch on the lake it would probably be towards the central part of the lake. I feel any access on the eastern part of the lake should be provided by the private sector, local or state government.

I would appreciate hearing your thoughts on boat launching sites. Perhaps you could come into the office and we could look at a map and discuss some sites. As I stated before, with our shrinking recreation budgets we will find it more and more difficult to construct new facilities. We would like to see public lake access improved, but I'm not sure the Forest Service is the one to do it.

Sincerely,

THEODORE W. BEAUVAIS
Assistant Ranger



100 Marley,
County Court House
St. Ignace, MI 49781
906-643-7340

MACKINAC COUNTY
ECONOMIC DEVELOPMENT CORPORATION

Gary L. Reid - Director

March 13, 1985

Mr. Ted Beauvais
U. S. Forest Service
West U. S. 2
St. Ignace, MI 49781

Dear Ted:


Per your request of today, enclosed please find our copy of the 'Brevort Township Mackinac county Wastewater Facilities Study', as well as blueprints (Map A) on the area in question. Rather than copy this particular file, we thought you might be able to go over same and find or copy what you need for your reference and return original to our office at your convenience.

As to other developments in line for the area, we are looking into the potential of an Industrial Park in the Moran area, a project in the early research stages.

In checking with Cheryl Schlehuber of the St. Ignace Recreation Committee, she advised that they do handle the work for the Brevort Township area as I mentioned and she noted that last year the township of Brevort was given \$5,000...for construction of a pavilion which is located at the Community Center. She does not think there is anything else in the working at this time for further recreation development but will inquire at their recreation meeting of tonight. Larry Colapietro (phone 643-7797) is the representative for Brevort Township and should be well aware of all plans for the community and possibly be able to answer other questions you may have in more detail and be able to work with you further on your needs.

We hope the information enclosed will answer some of your questions and may we be of further assistance please feel free to contact us. We would also like to be kept abreast of your findings on the changes you see for the area regarding the statistics of residents, visitors, more fishing, needed habitat improvements, additional demands for more campgrounds, better or more access for boat launching, etc. The gains of the economic impact will certainly effect the community through property values, land use as you stated - all leading to further development for the area and we appreciate your contacting us and will keep in touch with you on the above project.

Sincerely yours,


Carol L. Jenkins
Secretary

encls(2)

c: Otto Roggenbuck/Supervisor

MACKINAC COUNTY

ECONOMIC DEVELOPMENT CORPORATION



100 Marley,
County Court House
St. Ignace, MI 49781
906-643-7340

Gary L. Reid - Director

March 18, 1985

Mr. Rob Clark
United States Forest Service
West U.S. 2
St. Ignace, MI 49781

Dear Mr. Clark:

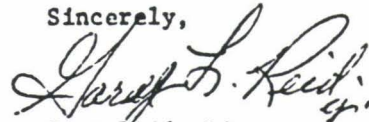
In regard to your earlier inquiry concerning travel and recreation indicators for the area as well as other information which depicts general characteristics of the traveling public, I have enclosed available data regarding the same.

As you will note, it is extremely difficult to generate information of a "localized" nature. It is generally accepted, in so far as average "stay days", etc. are concerned that the information such as that outlined in the Sault Ontario study would have application throughout the E.U.P. as a whole.

Please be reminded that we are interested in discussing any potential avenues of assistance or support we could provide in enhancing the recreational value of the Federal Forest. We feel your current efforts in development of cross country ski-trails as well as your long term objectives for improvements at the Carp River access will have significant impact upon recreational expenditures in our area.

I am hopeful that the enclosed material will provide you with sufficient information in which to draw some general conclusions regarding the travel and recreation industry.

Sincerely,



Gary Reid, Director

GR/cas
encls.

COUNTY TRAVEL EXPENDITURES, UPPER PENINSULA

<u>County</u>	<u>1982</u>
Alger	\$ 8,892,000
Baraga	3,021,000
Chippewa	43,890,000
Delta	39,501,000
Dickinson	30,324,000
Gogebic	43,662,000
Houghton	28,215,000
Iron	8,493,000
Keweenaw	14,421,000
Luce	9,747,000
Mackinac	126,882,000
Marquette	52,839,000
Menominee	2,337,000
Ontonagon	17,613,000
Schoolcraft	<u>15,960,000</u>
Total in Upper Peninsula	\$445,797,000

Data from Travel Bureau, Department of Commerce,
Lansing, MI

1982 expenditure figures have been compiled by the Travel Bureau using United States Census Bureau Business Survey Data released in 1979. The expenditure figures have been refined by the Travel Bureau by incorporating information on tourism related business activity, obtained directly from Michigan Counties, when available.

PROFILE OF THE SPRING/SUMMER TOURIST

IN

MICHIGAN'S UPPER PENINSULA

UPPER PENINSULA TRAVEL & RECREATION ASSOCIATION

and

MICHIGAN STATE UNIVERSITY - COOPERATIVE EXTENSION SERVICES, Cooperating
Made possible through a Title V Rural Development Grant

Keith McLeod, President
Upper Peninsula Travel & Recreation
Association

The survey cards were color coded according to location.
Respondents by survey card location were.

- 21% Food and Beverage
- 28% Attractions
- 8% Campgrounds
- 25% Lodging Facilities
- 18% Information Centers

In conclusion it is important to call attention to quoting from our study. While 2,193 card replies represent a very large sample size, we must be cautious about the inferences we draw. We can assume that all visitors did not respond to our survey, therefore, our report may not reflect their profile. However, aside from this limitation, our survey represents the best information we have on those traveling and vacationing in the Upper Peninsula during the 1977 spring/summer season.

Due to the aid of the computer, further information and analysis is available to the Association. Profiles to the above summary categories can be determined by County. A profile of the spring/summer visitor who spent seven nights or more in the Upper Peninsula is also available.

The Association is grateful for the support and grant obtained by Ray Gummerson of Michigan State University - Cooperative Extension Services.

The Association is grateful to Richard E. Tieder, Michigan Technological University, for assisting with the analysis of this study.

Keith McLeod
President
UPTRA

The Upper Peninsula Travel & Recreation Association in cooperation with Michigan State University - Cooperative Extension Service is pleased to offer the following profile of the Upper Peninsula Spring/Summer Tourist.

The following information is obtained from over two thousand replies of a visitor survey card (Appendix A) distributed during May thru September 1977.

In brief form, we discovered our summer visitor:

1. 48% Came from Michigan
12% From Wisconsin
23% From the balance of the North Central States
17% All Other regions
2. 85% Came specifically to the Upper Peninsula
15% Were passing through
3. 15% Had no special Upper Peninsula destination
32% Sought the Eastern Upper Peninsula
23% The Central Upper Peninsula
30% The Western Upper Peninsula
4. 49% Stayed at a motel or hotel
24% In State Campgrounds
15% In Private Campgrounds
9% Friends
8% Resorts
5. Party Size

1 Person - 13%	3 People - 14%
2 People - 44%	4 People - 16%
6. Age Classification
 1. Under 18 - 21%
 2. 18-24 - 18%
 3. 25-34 - 19%
 4. 35-44 - 16%
 5. 45-54 - 14%
 6. 55-64 - 10%
 7. 65 and over - 3%

73% of the visitors
were under 45
7. Activities participated in
 - 86% Sightseeing
 - 60% Historic Sights
 - 33% Shopping
 - 32% Paid Admission
 - Swimming
 - 25% Fishing
 - 22% Rock Hounding

8. Nights spent in the Upper Peninsula

- 1 Night - 10%
- 2 Nights - 14%
- 3 Nights - 15%
- 4 Nights - 10%
- 5 Nights - 9%
- 6 Nights - 7%
- 7 or more- 28%

9. What prompted the visit

- 53% Previous Visit
- 26% Recommendations of others
- 7% Advertising

10. Purpose of the Trip

- 82% Vacation
- 13% Visit Friends
- 8% Business/Pleasure

11. Expenditures

- 89% spent \$600.00 or less

From the data, it was estimated that each survey respondent spent \$293.00.

12. Will they return in the winter

- 56% yes
- 44% no

13. If they return in the winter for what reasons

- 60% Sightseeing
- 35% Snowmobiling
- 33% Skiing
- 19% Ice Fishing
- 8% Other

14. Comments on the Upper Peninsula

- 87% Positive
- 13% Negative

APPENDIX A

MICHIGAN STATE UNIVERSITY/UPTRA SPRING/SUMMER VISITOR SURVEY CARD

Date _____

Please Take Time to Fill Out This Postage Free Card to Help Us Improve Our Hospitality

1. Where is your home? City _____ State _____
 2. Did you come specifically to visit Michigan's Upper Peninsula (the U.P.) or are you just passing through? ☐ Specifically ☐ Passing Through
 3. Where in the U.P. do you plan to spend most of your time? _____
 4. What accommodations will you use? ☐ Motel Hotel ☐ Resort ☐ Friends
☐ Private Campgrounds ☐ State National Campgrounds ☐ Other - Describe _____
 5. What activities will you participate in? (Check one or more) ☐ Sightseeing
☐ Visiting Historic Sites ☐ Boating ☐ Swimming ☐ Fishing ☐ Rockhounding
☐ Golf ☐ Tennis ☐ Paid Admission Attractions ☐ Shopping ☐ Evening Entertainment
 6. How many nights will you spend in the U.P.? (0) (1) (2) (3) (4) (5) (6) (7) or more
 7. Of those traveling with you, how many are there in the following age groups? 13-19 _____
20-29 _____ 30-39 _____ 40-49 _____ 50-59 _____ 60-69 _____ 70 and over _____
 8. What prompted you to come to the U.P.? ☐ Previous Visit ☐ Recommendation of Others
☐ Sport & Travel Shows ☐ Advertising ☐ News Stories ☐ Other, please list: _____
 9. What is the purpose of your trip? ☐ Vacation ☐ Visit Friends ☐ Business
☐ Business Pleasure ☐ Convention ☐ Shortest Route ☐ Other, please list: _____
 10. Circle expenditure group that most nearly represents your expenditures in the U.P. on this trip. Don't forget lodgings, food, amusements, gas, rentals, souvenirs, things charged on credit cards.
\$100 or less \$100 to \$300 \$300 to \$600 \$600 to \$1,000 \$1,000 to \$1,500 \$1,500 to \$2,000
Over \$2,000
 11. Would you like to return to the U.P. in the winter? ☐ Yes ☐ No. If yes, what activities would interest you? ☐ Skiing ☐ Snowmobiling ☐ Winter Sightseeing ☐ Ice Fishing ☐ Hunting
☐ Other, please list _____
- We welcome your comments about the U.P. _____
- _____



Upper Peninsula Travel & Recreation Association
P. O. Box 400
Iron Mountain, Michigan 49801

PROFILE OF THE UPPER PENINSULA
FALL TOURIST

Keith McLeod, Director
Upper Peninsula Travel & Recreation Assn.
October, 1974

The Upper Peninsula Travel and Recreation Association is pleased to present a profile of the Upper Peninsula Fall Tourist.

The following information is derived from a visitor survey card distributed and returned during September and the first half of October, 1974.

In a brief summary form, we discovered our fall visitor:

1. 50% came from Michigan
13% from Wisconsin
23% from the balance of the North Central States
14% outside the North Central States
2. 86% came specifically to the Upper Peninsula
14% were passing through
3. 36% had no special U.P. destination
16% sought the Eastern U.P.
23% the Central U.P.
26% the Western U.P.
4. 62% stayed at a motel or hotel
24% in campgrounds
5. Party Size
1 Person - 19%
2 Persons - 50%
3 or more persons - 31%
6. Activities Participated in
83% Sightseeing
46% Historic Sights
28% Shopping
25% Paid Admission Attractions
7. Nights spent in the U.P.
1 Night - 12%
2 Nights - 18%
3 Nights - 16%
4 Nights - 15%
5 Nights - 10%
6 Nights - 6%
7 or more Nights - 23%
8. What prompted the visit
46% Previous Visit
28% Recommendation of Others
9% Advertising

9. Purpose of the Trip
 - 75% Vacation
 - 12% Visit Friends
 - 7% Business/Pleasure
10. Expenditures
 - 93% spent \$600 or less
 - From the data, it was assumed that each survey respondent spend \$250
11. Will they return in the winter
 - 48% Yes
 - 52% No
12. If they return for the winter - for what reasons
 - 48% Sightseeing
 - 22% Snowmobiling
 - 15% Skiing
 - 15% Other
13. Comments on the U.P.
 - 85% Positive
 - 11% Negative
 - 4% Uncertain
14. Respondents by Survey Card Color
 - 14% Blue - Food/Beverage
 - 41% Green - Attractions
 - 9% Red - Campground
 - 32% White - Lodging
 - 4% Yellow - Information Centers

The above summary responses are displayed in greater detail in the body of the report which follows.

Due to the aid of the computer, further information and analysis is available to the Association. For example, profiles to the above summary categories can be determined by county, activity, age, purpose, nights spent in the U.P. and dollar expenditures. For instance, Delta County tourists responding to our survey card came from Michigan (4), Wisconsin (4), Ohio (1), outside the Midwest (5). Nights spent in Delta County: One night (2), two (2), four (2), week or more (7). Dollars spent: Under \$100 (4), \$100-300 (4), \$300-600 (3), \$600-1,000 (2). Will they return to Delta County in the winter: Yes (4), No (9).

Other counties generated a larger amount of replies. Delta County was used as an example due to this report being presented at the UPTRA Annual Meeting.

In conclusion it is important to call attention to quoting from our study. While 422 card replies (see Appendix A for an example) represent a large sample size, we must be cautious about the inferences we draw. We can assume that all visitors did not respond to the survey, therefore, our report may not reflect their profile. However, aside from this limitation, our survey represents the best information we have to date on those traveling and vacationing in the Upper Peninsula.

Keith McLeod, Director
Upper Peninsula Travel and Recreation Association

The Association is grateful to Professor Kent Kerby and Assistant Professor Rodney Aldrich in the Department of Management and Marketing of Northern Michigan University for compiling and tabulating the data from which this report is derived.

THE FALL TOURIST TO THE UPPER PENINSULA

*(% Total more than 100% - several responses were made to the question)

1. Home State

50.2% Michigan	5.0% Minnesota
13.2% Wisconsin	2.2% Indiana
9.1% Illinois	13.9% All Other
6.5% Ohio	

2. 86.4% Specifically Visiting U.P.
13.6% Passing Through

3. Where do you plan to spend most of your time

35.5% Throughout the U.P.	1.8% Dickinson County
3.7% Chippewa County	4.6% Marquette County
9.2% Mackinac County	1.2% Iron County
2.8% Luce County	2.1% Baraga County
5.8% Schoolcraft County	10.7% Houghton County
4.3% Delta County	9.5% Keweenaw County
5.5% Alger County	1.2% Ontonagon County
0.6% Menominee County	1.5% Gogebic County

*4. Accommodations

62.1% Motel/Hotel	11.6% Private Campground
6.6% Resort	12.3% State Campground
6.4% Friends	10.0% Other

5. Party Size

5.2% - No Response	1.2% - 6 persons
17.8% - 1 person	0.0% - 7 "
47.6% - 2 persons	1.2% - 8 "
10.0% - 3 "	.2% - 9 "
13.7% - 4 "	.2% -10 "
2.1% - 5 "	.2% -16 "

*6. Activities

83.2% Sightseeing	3.6% Golf
46.2% Historic Sights	3.1% Tennis
9.5% Boating	24.9% Paid Admission Attractions
3.3% Swimming	27.7% Shopping
14.9% Fishing	8.5% Evening Entertainment
16.6% Rock Hounding	

7. Nights in the U.P.

1 night - 11.6%	Cummulative
2 nights - 18.3%	29.9%
3 " - 16.0%	45.9%
4 " - 14.7%	60.6%
5 " - 9.5%	70.1%
6 " - 6.4%	76.5%
7 or more- 23.5%	100.0%
nights	

*8. What Prompted your visit

45.7% Previous Visit
 27.7% Recommendation of Others
 2.4% Sport and Travel Shows
 9.0% Advertising
 4.3% News Stories
 25.6% Other

*9. Purpose of the trip

74.9% Vacation
 12.1% Visit Friends
 3.6% Business
 6.9% Business/Pleasure
 .2% Convention
 .2% Shortest Route
 9.0% Other

10A. Expenditure in U.P.

\$ 100 or less	-	29.3%	Cummulative
100 - 300	-	48.2%	77.5%
300 - 600	-	15.3%	92.7%
600 - 1,000	-	4.9%	97.7%
1,000 - 1,500	-	1.0%	98.7%
1,500 - 2,000	-	.3%	99.0%
2,000 and over	-	.9%	100.0%

B. Expenditure Analysis and Assumptions of the 422 Card Data Base, 386 Responded to the Income Question:

113 Spent \$	\$ 100 or less	-	Estimate	\$ 50 or \$ 5,650
186 "	100 - 300	-	"	200 " 37,200
59 "	300 - 600	-	"	450 " 26,550
19 "	600 - 1,000	-	"	800 " 15,200
4 "	1,000 - 1,500	-	"	1,250 " 5,000
1 "	1,500 - 2,000	-	"	1,750 " 1,750
4 "	2,000 or more	-	"	2,500 " 10,000

Total of 386 spent approximately \$101,350, or each fall visitor is assumed to have spent \$262.56, say \$250.00 per person.

11. Will you return in the Winter

48.4% Yes
 51.6% No

12. Yes Respondents will participate in

Skiing - 14.7%
 Snowmobiling - 22.2%
 Sightseeing - 47.7%
 Ice Fishing - 10.4%
 Other - 5.0%

13. Comments on U.P. Replies

Positive - 84.6%	225
Negative - 11.3%	30
Uncertain- 4.1%	11

14. <u>Card Color</u>	<u>UTPA DISTRIBUTED</u>	<u># RESPONDING</u>	<u>%</u>
Blue - Food/Beverage	1,200	58	13.7
Green - Attractions	4,500	173	41.0
Red - Campground	1,200	38	9.0
White - Lodging	8,800	137	32.5
Yellow - Info Centers	4,500	16	3.8
	20,200	422	100.0%

15. Age Groups

	One In Group	Two	Three	Four or More
Under 18	51.1%	33.3%	6.7%	8.9%
18 - 24	42.2	46.9	3.1	7.8
25 - 34	38.8	55.3	3.5	2.4
35 - 44	52.7	41.8	3.6	1.8
45 - 54	50.9	39.6	2.8	6.6
55 - 64	48.8	45.6	5.6	0.0
65 and over	50.4	36.3	7.1	6.2

Columns total 100 adding across. Data response does not give us much reliable information, indicating the question should be restructured.

16. Skiing Analysis - 41 Replies

Profile of the Fall Tourist Who will Return for Skiing

<u>Color</u>	<u>Blue</u>	<u>Green</u>	<u>Red</u>	<u>White</u>	<u>Yellow</u>		
%	12.2	31.7	17.1	31.7	7.3		
<u>State</u>	<u>Mich.</u>	<u>Wisc.</u>	<u>Minn.</u>	<u>Ill.</u>	<u>Ohio</u>	<u>Other</u>	
%	34.1	19.5	7.3	14.6	4.9	19.5	
<u>Nights</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7 or more</u>
%	5.3	23.7	10.5	7.9	10.5	7.9	34.2
<u>Dollars Spent</u>	<u>\$100 & Less</u>		<u>\$1-300</u>		<u>\$3-600</u>	<u>\$6-1,000</u>	<u>\$1-1,500</u>
%	26.5		29.4		20.6	17.6	5.9



HIAWATHA LAND

ITS PEOPLE

ITS RESOURCES

FEBRUARY, 1984

Brevoort Reef Project Underway

Activity along the north shore of Brevoort Lake on the St. Ignace Ranger District has increased steadily since the first of the year with preparations for construction of the Brevoort Lake Diversity Reef.

Believed to be the first of its type and size for an inland lake, the reef is being constructed this winter to minimize impacts of truck traffic on seasonal residents and area roads.

Initial progress on the fish habitat improvement project began with the awarding of the contract on Jan. 12 to A. Lindberg and Sons of Ishpeming.

Preliminary plans for the reef were initiated several years ago, with a public meeting held in June, 1982, to discuss options for the project with interested area property owners, sportsmen's groups and residents.

Since that time, the original project size has been reduced to a 1,400-foot-long structure due to a lack of funds. The cost of the current project is set at \$320,000.

Additional phases of the project may be undertaken as funds become available.

Of the amount for the current phase, the Michigan Department of Natural Resources has contributed \$20,000, plus rock from the DNR pit at Rexton valued at about \$40,000.

The objective of the reef, according to Fisheries Biologist Chuck Bassett, is to provide conditions favorable to producing aquatic insects on which walleye, small-mouth bass and other fish feed as well as offering conditions suitable for spawning.

With fishing pressure on the popular lake expected to continue, the reef was proposed to provide habitat missing on its primarily sandy bottom.

The reef's presence is expected to increase the number of fish produced in the lake, which has seen recent stocking efforts on the part of the DNR.

Construction is expected to take at least two months from the scheduled startup date, Feb. 1.

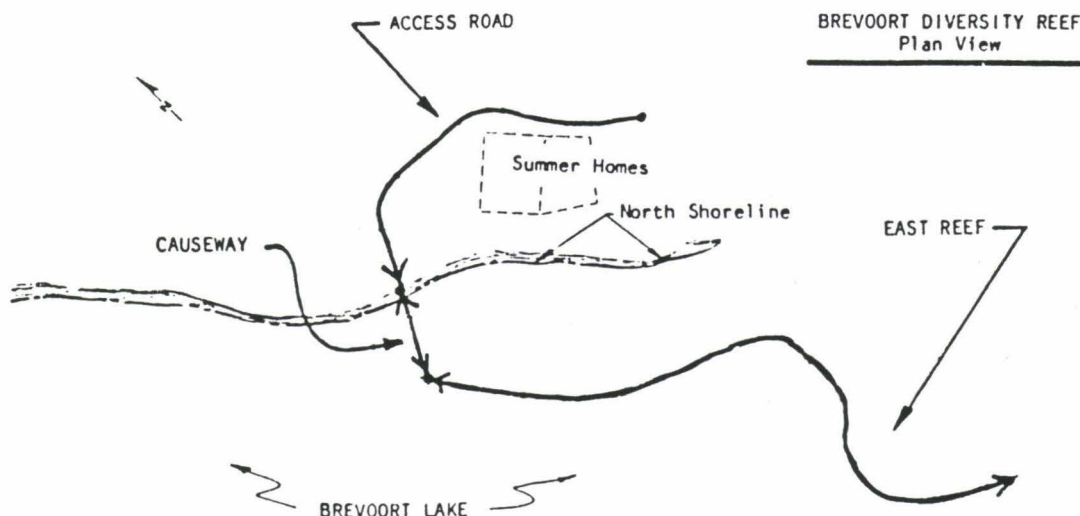
Initially, a 230-foot-long

causeway is being constructed from the access road near the summer home group on Black Point out onto the lake, where 27,000 tons of rock will be placed to construct the reef.

When complete, the structure will range from 10 feet wide at the top to 65 feet wide at its base on the lake bed. It will extend about two and a half feet above the water, giving the appearance of a breakwater.

Caution is being advised to anyone using the lake because the project involves removing ice to place the rock, which may alter surface conditions, and because the new structure will extend above the surface of the lake.

The causeway will be blocked from shore access after the work is finished but will remain in place until assessment of the stability of the reef has been completed. A navigational marker will be placed prior to the boating season to indicate the presence of the reef.



BREVOORT DIVERSITY REEF
Plan View

Appendix G

Appendix H

Appendix H

Hiawatha National Forest (East Unit)

T. 41 N., R. 5 W.















MICHIGAN

1975

Scale 1:31,680

0 1/2 1 MI.

LEGEND

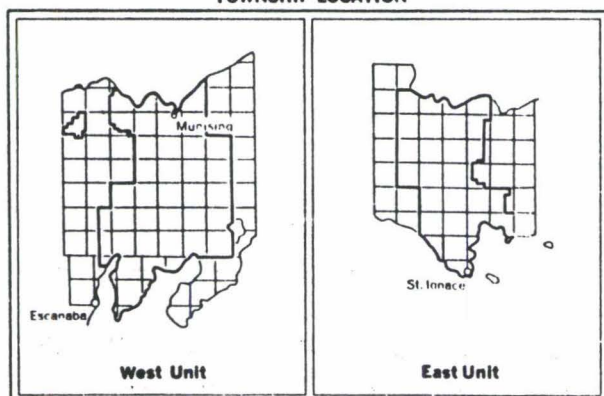
- | | | | |
|---|--------------------------|---|--------------------|
|  | National Forest Boundary |  | Interstate Highway |
|  | Primary Highway |  | U.S. Highway |
|  | Secondary Highway |  | State Highway |
|  | Light Duty Road |  | County Route |
|  | Unimproved Road |  | Forest Route |
|  | Trail or Manway |  | Monumented Corner |
|  | District Ranger Station |  | Meander Corner |

 National Forest Land as of November 1, 1974

Forest Supervisor's Headquarters, Escanaba, Michigan

 PROPOSED MANAGEMENT AREA BOUNDARY

TOWNSHIP LOCATION

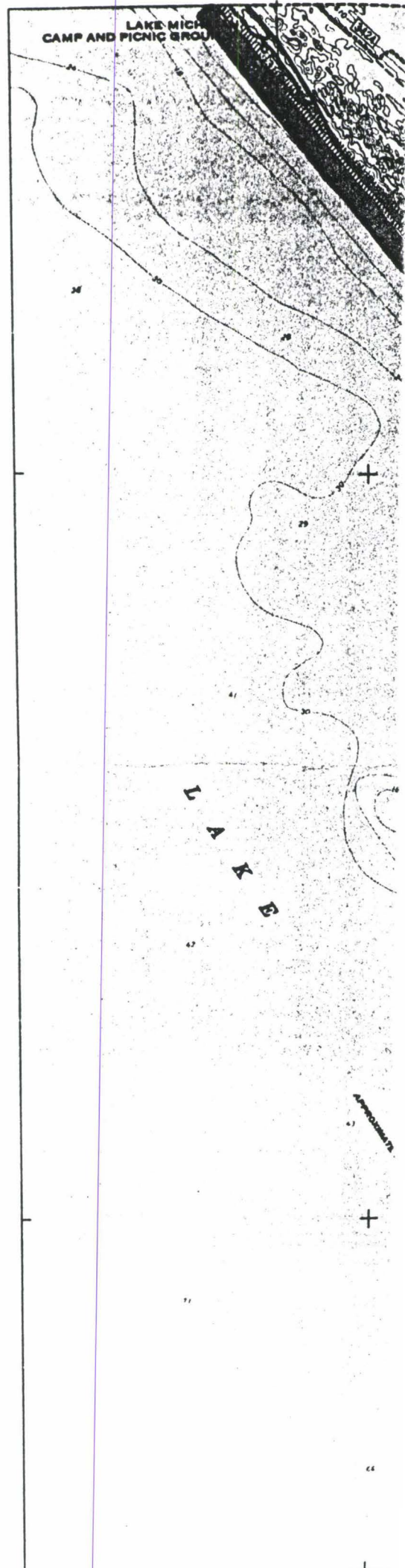


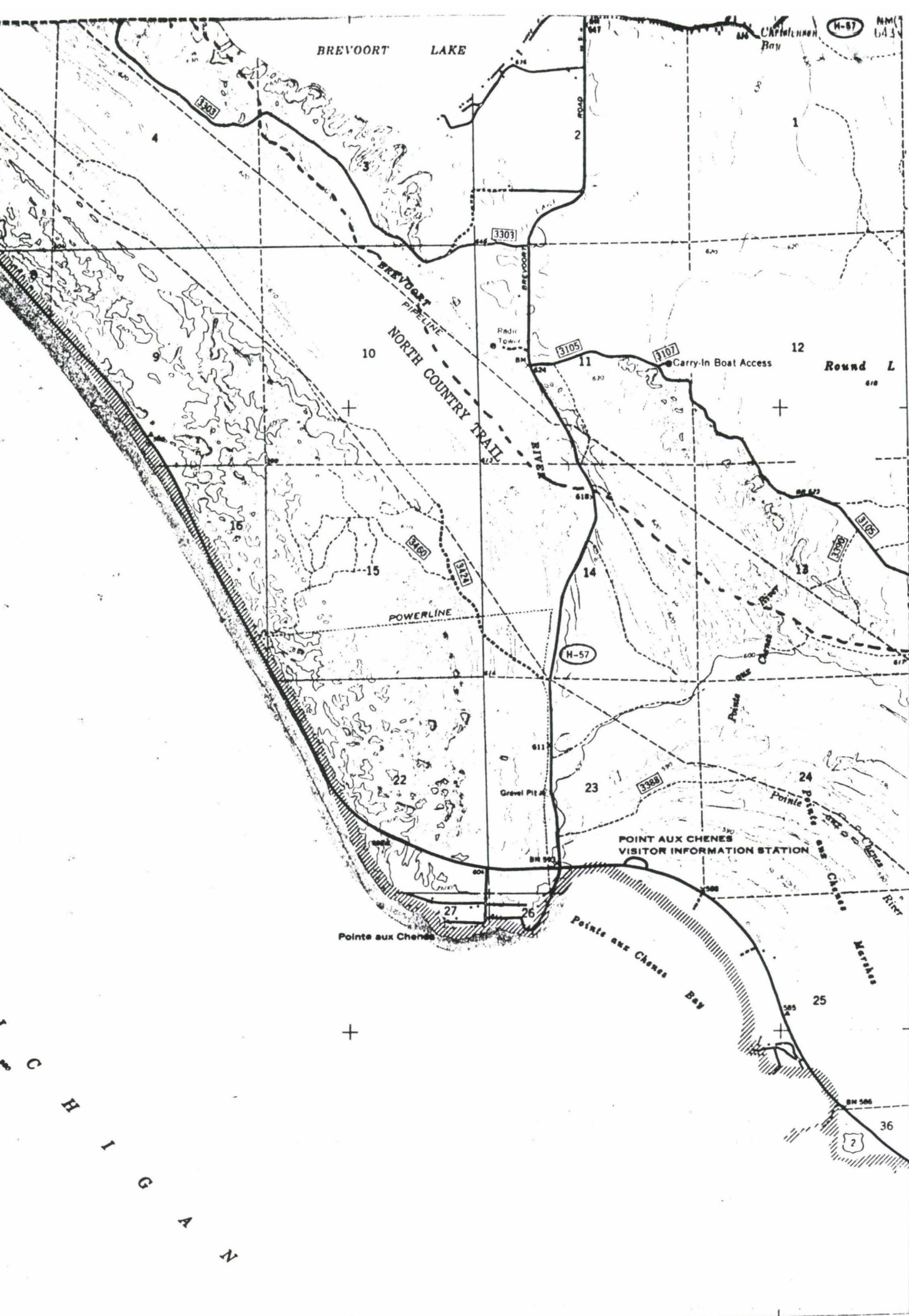
FOREST SERVICE MAP CLASS A

Polyconic Projection—1927 North American Datum

Monumented and meander corners shown in approximate relative position only.
Contour datum is mean sea level and is indicated in 10 foot intervals.

Maps have been photomechanically reproduced and converted to 1:31,680 scale township maps from 1:24,000 scale U.S. Geological Survey Standard Accuracy quadrangle maps. Revised from 1:60,000 scale high altitude 1970 aerial photo-





U.S. Department of Agriculture
Forest Service
John R. McGuire, Chief

Hiawatha National Forest (East Unit)

T. 42 N., R. 5 W.















MICHIGAN

1975

Scale 1:31,680

0 1/2 1 MI.

LEGEND

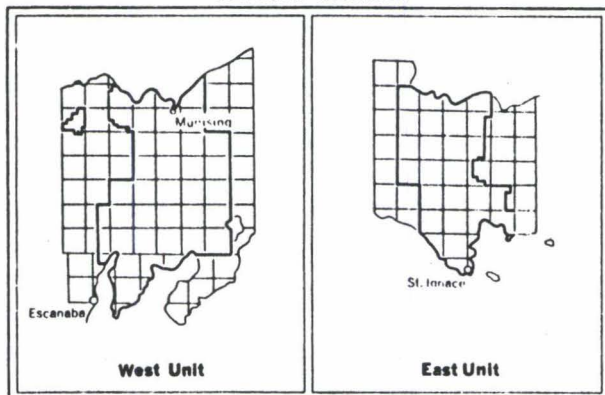
- | | |
|--|--|
|  National Forest Boundary |  Interstate Highway |
|  Primary Highway |  U.S. Highway |
|  Secondary Highway |  State Highway |
|  Light Duty Road |  County Route |
|  Unimproved Road |  Forest Route |
|  Trail or Manway |  Monumented Corner |
|  District Ranger Station |  Meander Corner |

 National Forest Land as of November 1, 1974

Forest Supervisor's Headquarters, Escanaba, Michigan

PROPOSED MANAGEMENT AREA BOUNDARY

TOWNSHIP LOCATION



FOREST SERVICE MAP CLASS A

Polyconic Projection—1927 North American Datum

Monumented and meander corners shown in approximate relative position only.

Contour datum is mean sea level and is indicated in 10 foot intervals.

Maps have been photomechanically reproduced and converted to 1:31,680 scale township maps from 1:24,000 scale U.S. Geological Survey Standard Accuracy quadrangle maps. Revised from 1:60,000 scale high altitude 1970 aerial photo-

